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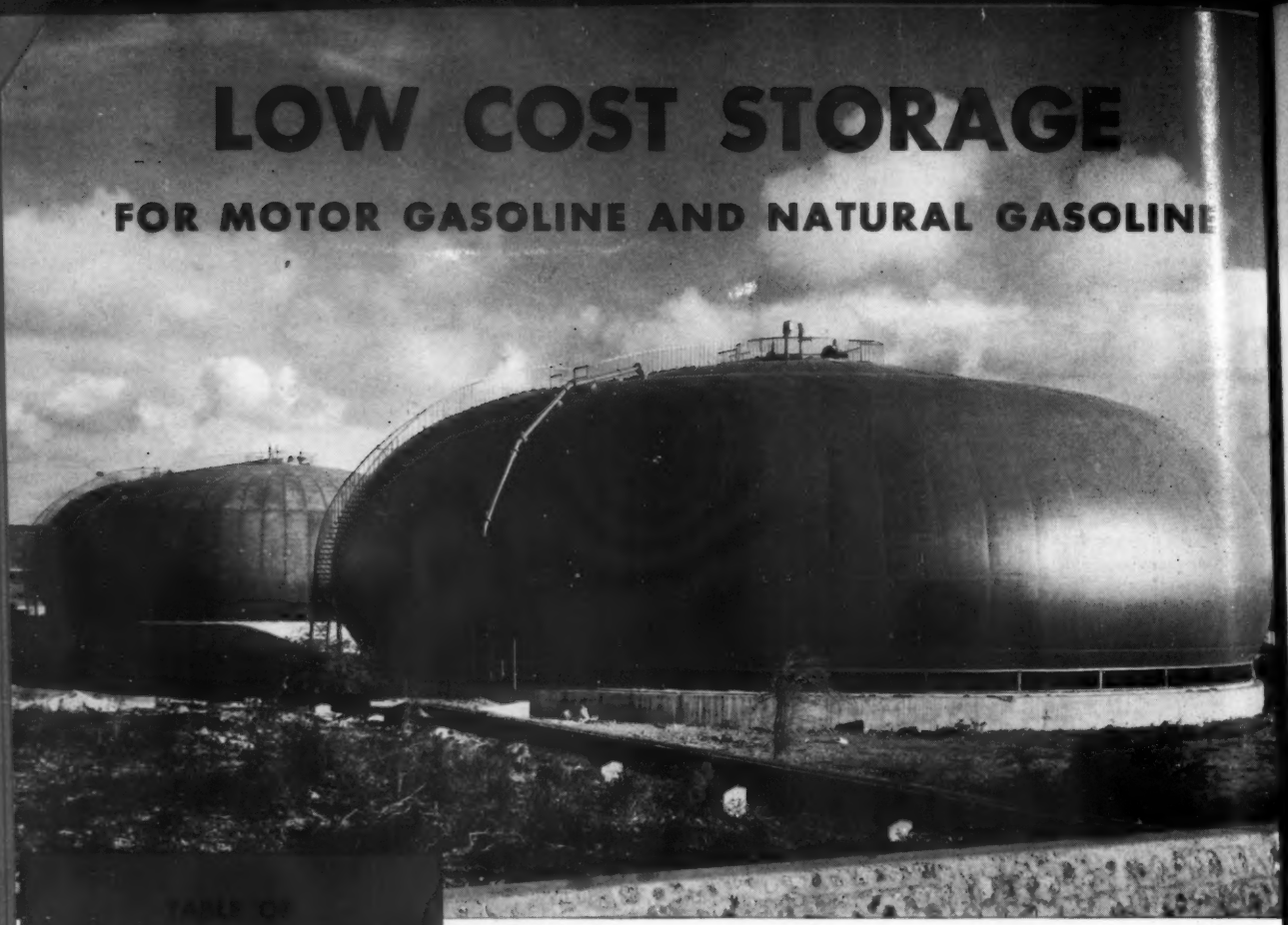

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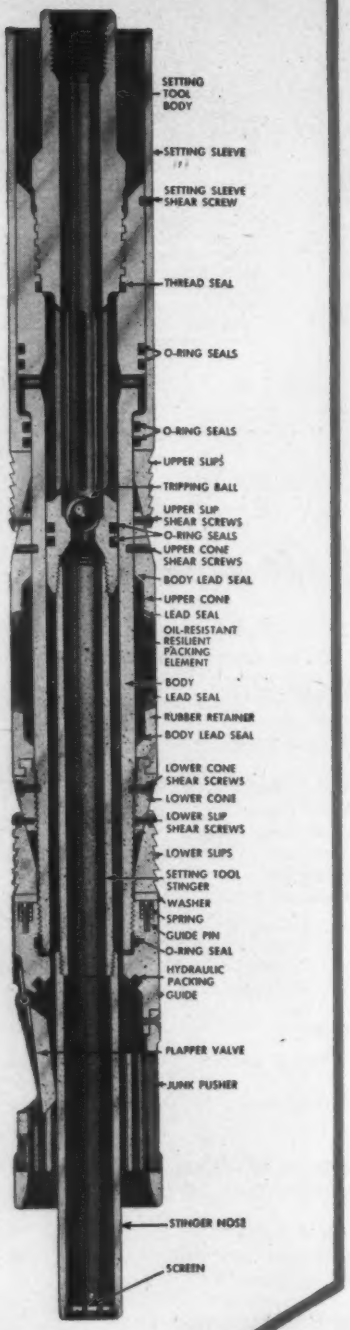

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THE OIL AND GAS JOURNAL

Earnings

ARKANSAS editor quips that his arithmetic fails to show a profit in the case of a friend who sold a $4,500 house for $10,000 and later built a $3,500 house for $9,000. When the income tax on capital gains is paid the friend will discover that he has paid several hundred dollars for the privilege of living in a house which is not as desirable as his original home.

This small-town transaction has its counterpart in today's petroleum operations. Measured in dollars the gross and net income of representative small and large operators this year will be greater than in any previous year. That fact has been stressed in recent government investigations involving marketing practices. But when replacement costs are considered essentially different comparisons result.

Oil earnings need to be appraised in the light of their purchasing power in replacing existing operating facilities from which current returns are coming. Most of today's oil profits emanate from oil discovered 5 or more years ago, and from prewar plants, transportation, and marketing.

An entirely different picture would be presented if today's profits were based on postwar costs. Readers know from their own experience and from authentic analyses made in recent months that exploration costs in finding a new barrel of crude oil have increased three or more times over a 5-year period. Development outlays are substantially greater. Costs of new plants and other construction are 50 to more than 200 per cent greater.

Every one should know what this means in present-day and future costs. As in the case of the Kansas home owner you have to balance the profits of the old against the cost of the new before you arrive at an accurate gage of 1947 net returns.

Some may be in a position to postpone new expenditures, hoping for deflated rather than constantly inflated costs. But as the head of one of the large integrated companies pointed out last month, the units with major responsibility have no choice but to expand their facilities to keep pace with a record peacetime expansion in demand and new standards in the processing arts and in quality of products.

Equally obvious is the fact that inflated costs have a direct bearing on reserves required for sound future operations. The petroleum industry has been accustomed from its beginnings to maintain adequate reserves and finance most of its steady expansion from current earnings. This means that in the future a larger allocation of earnings to reserves plus new financing in many cases are inevitable in domestic and foreign operations.

Let government investigators and others appraise the industry's earnings in the light of these new conditions over which oil operators have no control, before they jump to conclusions.

San Juan-Needles Line Part of New El Paso Natural Expansion

by Paul Reed

THE 470-mile, 26-in. natural-gas pipe line from a New Mexico point in San Juan Basin to a terminal at Needles, Calif., represents one of three important undertakings of El Paso Natural Gas Co. to increase facilities in order to transmit ultimately a total of 505,000,000 cu. ft. daily to California in 1952.

In a new application filed with Federal Power Commission, El Paso Natural asks permission to lay the San Juan Basin-Needles line and also to build loops totaling 438 miles of 26-in. for its Permian Basin-Blythe, Calif., line. In connection with this looping it is expected that compressor facilities of 32,800 hp. will be installed. The Permian Basin-Blythe, Calif., main line is now under construction.

Each of the two projects represents 100,000,000 cu. ft. capacity. Consequently the Permian Basin-Blythe, Calif., looping will raise the ultimate throughput for the system to Blythe from the previously announced figure of 305,000,000 to 405,000,000 cu. ft. daily. The San Juan Basin-Needles line will add another 100,000,000 cu. ft., bringing El Paso Natural's deliveries to California up to 505,000,000 cu. ft. daily.

Gas reserves are being developed in the San Juan Basin by Western Natural Gas Co., an affiliate of El Paso Natural.

Will Be Built in 1950-51

The San Juan Basin-Needles line will be built in 1950 and 1951 for commencing scheduled deliveries to Pacific Gas & Electric Co. connections at Needles, Calif., on January 1, 1952. Construction for the Permian Basin-Blythe looping is reported to be scheduled to begin in 1952 or 1953, in accordance with the requirements of the gas market in California.

Of most immediate significance in the third measure of El Paso Natural to augment deliveries to California is the recent placing of orders for compressors with Clark Brothers Co., Inc., Cooper - Bessemer Corp., and Ingersoll-Rand Co. having a total of 85,000 hp. Installation of these units will start as early as November 1, 1947. The remainder will be installed in 1948. This means that instead of the throughput in the last part of 1948 being 175,000,000 cu. ft. as previously announced, the addition of these units will bring throughput next year up to the 305,000,000 cu. ft. capacity formerly anticipated for the later years.

Construction of the 740-mile, 26-in. Permian Basin-Blythe, Calif., line is progressing at a rate planned so as to commence initial deliveries of 50,000,000 cu. ft. daily on November 1. The line will be delivering at full rated capacity of 175,000,000 cu. ft. by January 1, 1948.

These deliveries will be made to the Southern California Gas Co. and Southern Counties Gas Co. 214-mile, 30-in. line now being completed to Los Angeles.

Both the proposed line to be laid from San Juan Basin to Needles, Calif., and the looping of the Permian Basin to Blythe, Calif., system base has been estimated to cost together a total of $55,395,340. At the San Juan County, N. M., end of the line, gas purification and dehydration facilities will be built.

Estimated Gas Shortage

San Juan Basin gas transmitted to Pacific Gas & Electric Co. at Needles will be delivered to San Francisco, Oakland, Berkeley, and other cities and towns of California.

It is estimated that there will be a shortage of natural gas available to distributing companies in California by 1952 of approximately 100,000,000 cu. ft. daily. By 1953 the shortage will be approximately 200,000,000 cu. ft. daily.

The facilities proposed "are designed to fit into and promote a comprehensive program of conservation of natural gas produced with oil in the Permian Basin of West Texas and Southeastern New Mexico," according to a statement by El Paso Natural Gas Co.

A contract between Pacific Gas & Electric Co. and Pacific Lighting Corp. providing for transmitting natural gas into Northern California has been approved by California Utilities Commission. This contract provides for purchase by Pacific Gas & Electric of 75,000,000 cu. ft. daily during 1948 and 100,000,000 cu. ft. daily afterward. The contract was made for the disposal of gas to be received from El Paso Natural's line to Blythe.

By bringing the Permian Basin-Blythe, Calif., line up to capacity of 305,000,000 for 1949 deliveries, instead of 1952 deliveries as originally planned, the Southern California companies are enabled to release gas to Northern California, according to Harold P. Huls, president, California Utilities Commission.

The Southern California companies would deliver their gas, produced in the San Joaquin, Calif., area, up to 100,000,000 cu. ft. daily to Pacific Gas & Electric Co., according to a statement of the commission. At the same time it would have available 305,000,000 cu. ft. from El Paso Natural.

"Biggest Inch" Gas Line Nearing Completion

With only 3 miles remaining to be laid at the beginning of this week, it is expected that the "biggest inch" 214-mile, 30-in. Blythe, Calif.-Los Angeles natural-gas line will be completed next week for Southern California Gas Co. and Southern Counties Gas Co.

One of the two main spreads of H. C. Price Co., the contractor, has finished. The other is working in the difficult "bad lands" area.

Amon G. Carter Sells Wasson Field Properties

Amon G. Carter Foundation, Fort Worth, has sold its properties in Wasson field, Gaines and Yoakum Counties, Texas, to Shell Oil Co., Inc., for an undisclosed consideration. Amon G. Carter, president of the foundation, in 1937 discovered Wasson field, now Texas second largest in annual oil production. Ninety-one net wells were involved in the transaction.

Louisiana Ups Allowable; Two States Unchanged

LOUISIANA has made a slight increase in state's September crude-oil allowable, while in Oklahoma and Kansas, regulatory bodies have decided to leave August allowables unchanged.

Daily average allowable in Louisiana was set at 471,185 bbl. daily, up 3,185 bbl. daily from August. Included was 105,907 bbl. daily for North Louisiana, and 365,278 bbl. daily for South Louisiana.

Oklahoma September allowable remains unchanged from August at 391,500 bbl. daily. In Kansas, the Corporation Commission accepted the recommendation of its conservation director, T. A. Morgan, that the September allowable be fixed at 290,000 bbl. daily—the August figure.

In Kansas, Corporation Commission Chairman Robertson declared, "Personally, I feel that there should be no shortage of fuel oil or gasoline in Kansas if we run 290,000 bbl. daily. The commission has no desire to build a fence around the State of Kansas, but we will not tolerate shortages."

Penn Grade Crude Hiked 20 Cents; Bradford Oil Now $4.50

OIL CITY, Pa.—The Joseph Seep Purchasing Agency of South Penn Oil Co. announced August 31 an increase of 20 cents per barrel in its posted price for Pennsylvania Grade crude oil in the various districts in which it purchases. The new prices went into effect September 1.

No increase was announced for Corning Grade by the Joseph Seep Agency. Corning was advanced 25 cents per barrel August 25.

Seep's new posted prices equaling a 23-year high follows:

Allegany district oil in Bradford Transit Co.	$4.50
Bradford district oil in Bradford Transit Co.	4.50
Bradford district oil in National Transit Co.	4.50
Bradford district oil (Tiona-Sheffield) in National Transit Co.	4.50
Pennsylvania Grade oil in Southwest Pennsylvania	4.29
Pennsylvania Grade oil in Eureka Pipe Line Co.	4.29
Buckeye Pennsylvania Grade Oil in Buckeye Pipe Line Co.	4.25

Waverly Oil Works Co., Pittsburgh, September 1, met Seep's price boosts and at the same time increased its posted price for Zanesville (Ohio) Pennsylvania Grade crude oil from $3.75 to $3.95.

Elk Refining Co., Charleston, W. Va., United Refining Co., Warren, Pa., and Valvoline Pipe Lines, Butler, also announced that they were meeting the new price increases.

Seep last increased its postings for Pennsylvania Grade crude July 1 when it hiked the prices 25 cents.

Bradford and Allegany district market price of $4.50 has not been equaled since the posting of January 30, 1924, when the price of $4.50 prevailed.

Various purchasers of Pennsylvania crude oil produced in the Middle district field (Kane to Butler) September 2 boosted the price from $4.17 to $4.37 per barrel. The companies which increased the Middle district price included Pennzoil Co., Quaker State Oil Refining Corp., and the Wolfs Head Oil Refining Co., Inc., Cities Service Co., Valvoline-Freedom Co., United Refining Co., and Pennsylvania Refining Co.

Tide Water Associated Oil Co., Quaker State, and Pennsylvania Refining announced they were meeting the Seep agency's 20-cent increase in the other grades.

BOYD TAKES OFFICE AS MINES BUREAU HEAD

James Boyd, former dean of Colorado School of Mines, took office August 27 as director of the U. S. Bureau of Mines. Above, at the oath-taking ceremony in Washington: Oscar L. Chapman, undersecretary of the Department of Interior; Clarence C. Davison, acting chief clerk of the department; Boyd, and J. A. Krug, secretary of the interior. Boyd is a 42-year-old native of Australia, a graduate of Hollywood (Calif.) High School and California Institute of Technology. In a statement made as he took office, he predicted a bright future for the production of liquid fuels from synthetic sources, a program being fostered by the Bureau of Mines under government appropriation. Boyd said synthetic production should develop into a great new United States industry in a few years and declared as soon as the work is "on its feet," the Government should pull out and leave the field to private industry. *(For comments on Boyd's appointment, see Watching Washington, page 55)*

Program Arranged for A.C.S. Petroleum Division

Fifty-two persons are collaborating in papers scheduled to be presented at sessions of the American Chemical Society's Division of Petroleum Chemistry to be held during the 112th national meeting of the society September 15-19 in New York.

The division, headed by Dr. Gustav Egloff, research director of Universal Oil Products Co., will hear papers on "High-Pressure Laboratory Flow Apparatus," by Dr. Vladimir N. Ipatieff, U. O. P. chemical research director, G. S. Monroe, and L. E. Fischer; "The Combustion of Motor Fuels," by Prof. Cecil Boord, Ohio State University; and "Investigations of Deposition and Oil Deterioration Phenomena by Means of a Motored Engine," by Dr. Hyman Diamond, H. C. Kennedy, and R. G. Larsen, Shell Development Co.

Also of interest to the petroleum group is a 2-day symposium to be held during the society's meeting under the sponsorship of the Division of Petroleum Chemistry and the Division of Gas and Fuel Chemistry. Several papers on progress in the production of liquid fuel from coal and natural gas will be given. Among the authors are H. S. Seelig and R. F. Marschner, Standard Oil Co. (Ind.), and C. W. Montgomery and N. B. Weinberger, Gulf Research & Development Co.

At the sessions of the Division of Petroleum Chemistry, other general papers will be presented by:

H. J. Hepp and F. E. Frey, Phillips Petroleum Co.; W. D. Offutt, M. C. Fogle, and H. Beuther, Gulf Research & Development Co.; C. L. Brown, W. G. Scharmann, J. F. Kunc, Jr., and W. C. Howell, Jr., Standard Oil Development Co.; W. M. Smith and G. E. Starr, Jr., Standard Oil Co. of New Jersey, Louisiana Division; C. R. Wilke, University of California; William James Wride, State College of Washington; Carl B. Linn, Louis Schmerling, Julian M. Mavity, Herman Pines, Richard C. Wackher, John A. Brooks, Nancy Corbin, and Mary Alexander, Universal Oil Products Co.; Aristid V. Grosse, Houdry Process Corp.

Alfred W. Francis, Socony-Vacuum Oil Co. Research & Development Laboratories; F. W. Melpolder, J. E. Woodbridge, C. E. Headington, and R. A. Brown, Atlantic Refining Co.; Rethel L. Hubbard and K. E. Standfield, U. S. Bureau of Mines; H. D. Dubois, D. A. Skoog, R. L. LeTourneau, and Robert Matteson, California Research Corp.; Anton J. Steiff, Evelyn T. Murphy, Janice C. Zimmerman, Laurel F. Soule, Vincent A. Sedlak, Charles C. Willingham, and Dr. Frederick D. Rossini, National Bureau of Standards; Richard F. Robey and Herbert K. Wiess, Standard Oil Development Co.; and Robert A. Van Nordstrand, William E. Kreger, and Herman E. Ries, Jr., Sinclair Refining Co.

Plant Instrumentation Economics Features Texas A.&M. Conference

by R. B. Tuttle

COLLEGE STATION, Tex. — More than 200 engineers gathered here August 27 to attend the 3-day annual Short Course on Instrumentation for the Process Industries. Conducted by the school of engineering, department of chemical engineering, of Texas Agricultural and Mechanical College, the course, or conference, was the second of a series inaugurated by the college in 1946.

Designed to provide operating and instrument engineers and technicians with first-hand information on new developments and on principles and practice of instrumentation as applied to continuous fluid-flow processes, the series is scheduled to run for an indefinite period.

This year's session was given principally to discussions of plant systems, their design, and basic considerations, including economics, involved in their instrumentation. Discussions this year were well balanced and included a range of subjects running all the way from actual plant hookups to detailed descriptions on various control apparatus now in the process of development. Control-system flexibility, instrument-department functions, and responsibilities were some of the other subjects discussed. Ample time was taken after each lecture for verbal discussions from the floor; participation in these discussions was high.

The first lecture on the opening day of the course was given by Dr. C. M. Blair, Carbide & Carbon Chemicals Corp., Texas City, Tex. In discussing "Economics of Instrumentation in the Process Industries," Blair pointed out several of the basic considerations involved in instrument application. The lecture stressed the importance of instrumentation in pilot-plant stage of process development as related to the economics of its commercial counterpart.

Functions and Responsibilities

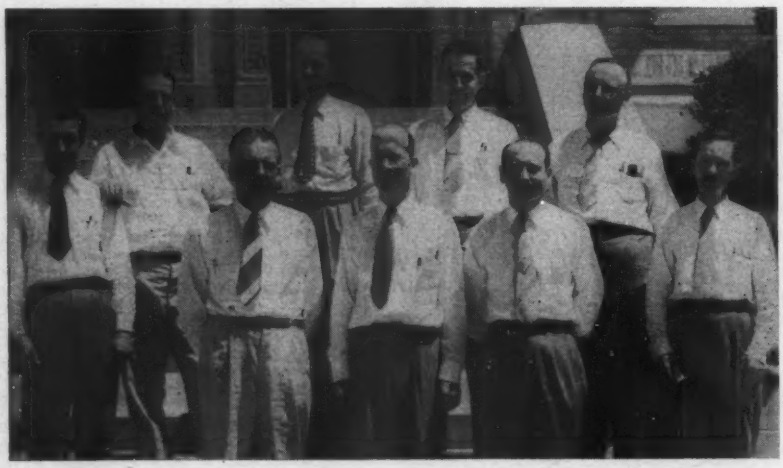
In his paper, "The Functions and Responsibilities of a Plant Instrument Department," J. G. Kerley, Shell Oil Co., Inc., New York, gave selection of an instrument, its installation, and its maintenance as the three major functions of an instrument department. In regard to attendent responsibilities Kerley emphasized instrument application as being first in order in a very widely ranged group of detailed responsibilities. J. G. Willson, with Shell Development Co., San Francisco, presented a paper on instrumentation as applied to speed control on prime movers, including the gas engine. The fourth paper on Wednesday's session dealt with "Flexibility in Unfired Process Control Systems" and was presented by F. H. Trapnell, E. I. duPont de Nemours & Co., Wilmington, Del. The subject matter covered in Trapnell's paper correlated readily with petroleum and petrochemical processing systems.

The first paper presented at the Thursday morning session was given by H. U. Fisher, Monsanto Chemical Co., Dayton, Ohio. This paper described many of the instruments from which security restrictions have been removed and which were developed in Clinton laboratory for the atomic-energy project. Other papers given at the second day's session included two on instrumentation of chemical processes and one on petroleum processing. All these were received with considerable interest by engineers in both chemical and petroleum processing fields, judging from the number of questions submitted on each from the floor.

"Instrumentation of Cycling Plants," the first paper presented Friday morning, outlined in detail the control system employed in this type of process. Prepared by A. J. L. Hutchinson, Fish Engineering Corp., Houston, the paper was presented by Tom Tabbert of the same organization. The final paper presented at this year's session was "Instrumenting Physical Methods of Chemical Analysis," by Nelson Gildersleeve, General Electric Co., Schenectady, N. Y.

A cross section of the opinions of the operating and instrument engineers and technicians attending the course showed that the engineering level to which the series is aimed meets with high approval. The omission of complicated mathematics from lectures and text also appeared to have general approval. All papers and lectures are narrowed down to within the scope of practicability in the processing field.

Friday's session closed with a forum or question-and-answer period where all authors and lecturers appearing on the program composed the answer panel. Questions submitted to the panel were in written form and their context confined to matters relating to subjects pertinent to current lectures and papers. W. H. Fortney, Humble Oil & Refining Co., Baytown, Tex., presided at this session for the second year.



Steering committee for the Second Annual Short Course on Instrumentation for the Process Industries held at Texas A. & M. College are shown here: Jimmy Dvoracek, Climax Engineering Co., Tulsa; W. H. Fortney, Humble Oil & Refining Co., Baytown, Tex.; L. W. Parten, The Foxboro Co., Houston; Porter Hart, Dow Chemical Co., Freeport, Tex.; Gil Farrar, Texas A. & M. College, College Station; P. G. Murdoch, Texas A. & M. College, College Station; Russell E. Hansen, Leeds & Northrup, Houston; Milton K. Anderson, Carbide & Carbon Chemical Corp., Texas City, Tex.; and J. A. Parker, Shell Oil Co., Inc., Houston. Not present when the photograph was taken: G. L. Gudenrath, Delta Engineering Co., Houston; R. L. Mallory, Minneapolis-Honeywell Regulator Co., Houston; and C. F. Tears, Process Engineers, Inc., Dallas

Technical Conference Planned

CHICAGO.—An all-day Technical Conference will be held December 26 by the Chicago Section of the American Chemical Society.

this week

PRICES— Pennsylvania Grade crude-oil buyers, led by South Penn Oil's purchasing agency, post 20-cent increase. . . . Action brings price of Bradford district crude to $4.50 per barrel, highest since January 30, 1924. . . . ¶Indiana Standard advances tank-wagon prices for distillate heating oils and diesel fuels 1/2 cent. . . .

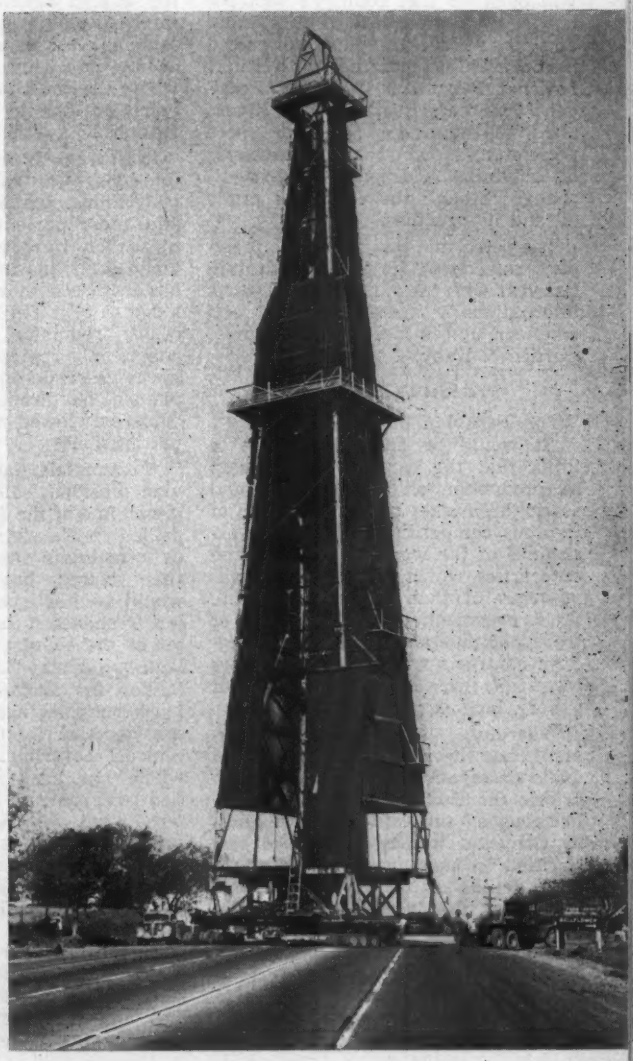
RECORDS— The Oil and Gas Journal's compilation shows United States crude-oil output for week ended August 30 at new all-time high at 5,172,490 bbl. daily. . . . Three states, Colorado, Mississippi, and Louisiana, also hang up new production records. . . . California and Oklahoma output sets 2-year records, while Kansas produces at highest rate since 1943. . . . ¶A.P.I. report for week ended August 23 reveals new record in refinery production of gasoline. . . . Total for week is 16,539,000 bbl.

NATURAL GAS— El Paso Natural files application with FPC to build 470-mile, 26-in. gas line from San Juan Basin to Needles, Calif. . . . Line to be completed in 1952 and will supply Pacific Gas & Electric Co. . . . . El Paso Natural also seeks permission to build 438 miles of 26-in. loops, beginning in 1952 or 1953, on the Permian basin-Blythe, Calif., line now under construction. . . . California Utilities Commission approves contract providing for purchase by Pacific Gas & Electric of gas for movement into northern California on completion of Permian basin-Blythe line. . . . ¶FPC reports a total of 4,634 miles of new gas lines and 285,074 new compressor horsepower was approved in fiscal year ended June 30. . . .

EXPLORATION—Plymouth Oil appears to have first commercial production in Sterling County, Texas, producing from Ellenburger. . . . ¶First Devonian production for Crockett County, Texas, found 6 miles northwest of Yates field. . . . ¶Bishop field of southwestern Nueces County, Texas, has new oil pay at 7,800-34 ft. . . . ¶Gulf well gives Lake Hermitage pool, Plaquemines Parish, Louisiana, new pay at 11,895-11,954 ft. . . . ¶Warren Oil has Wilcox sand discovery in Noble County, Oklahoma, flowing 50 bbl. oil per hour. . . . ¶Del Valle field, Los Angeles County, California, has new deep producing zone at 10,933 ft. . . . ¶Leduc extension well, Globe-Leduc West 2, appears to be best completion thus far in field. . . .

REFINING—Standard Oil (Ohio) announces plans for construction of new catalytic cracking unit and other facilities at Lima (Ohio) refinery. . . . Cost of modernization program placed at $10,000,000. . . . ¶Unofficial reports indicates Carter Oil's Billings, Mont., refinery may be completed on smaller scale than 20,000-bbl. plant originally planned. . . . Besides rising costs which caused halt in work for reappraisal, crude-oil supply complicates project. . . . ¶Aurora Gasoline Co., formally accepts new Fluid catalytic cracking unit recently completed at company's Detroit refinery. . . .

INTERNATIONAL— Mexican Government reaches settlement with British and Dutch officials over long-pending expropriation claim for El Aguila properties. . . . Company to accept $81,250,000 with 3 per cent interest. . . . ¶Agreement between Trans-Arabian Pipe Line Co. and the Syrian Government disclosed in Damascus. . . . Terms allow construction of $150,000,000 Arabian-Mediterranean crude-oil pipe line through Syria. . . .



MOVING DAY.—*Motorists in Long Beach, Calif., faced this sight when Shell Oil Co., Inc., moved a 136-ft. derrick to a new location. On this particular job, the derrick was taken some 1,200 ft. Under methods used by the company, derricks can be taken over ground where they lean as much as 14° off the perpendicular. An article on such operations entitled "Rolling Heavy Rigs on Wheels," appeared in The Oil and Gas Journal, August 2, pages 58-59*

International

WORLD-WIDE OIL DEVELOPMENTS

Peruvian President Urges Approval Of New Petroleum Law

IN urging the Peruvian Congress to give serious consideration to the passage of a petroleum law which will open up that country's vast potential oil region east of the Andes and to approve the much discussed Sechura Desert contract with International Petroleum Co., Ltd., President Jose Luis Bustamente y Rivero cited the domestic need for more petroleum as well as the necessity of obtaining additional foreign exchange through the export of crude oil and its products.

The petroleum law which the president referred to is the one drafted last year with the aid of A. A. Curtice, internationally known geologist and engineer and a partner of Hoover, Curtice & Ruby.

President's Statement

The Peruvian president said:

"It would be entirely illusory to think that the country can develop its production on a large scale and reach the market under conditions of rigorous competition without the assistance of the world-wide petroleum enterprises which dispose of the advantages of their enormous capital, their organization, their means of transportation and storage, of long-term contracts which open the doors to certain markets, and above all, of a very long experience.

"Therefore, the government (Peruvian) has deemed it necessary to make observations on the law establishing the Corporacion Peruana del Petroleo, so that after a new study by Congress, it may be revised and clarified in such parts which might offer doubts as to whether the intention of the legislature is to lay the basis for a state monopoly, which would drive away international firms, as well as to correct certain defects in its structure.

"The government desires that the objectives of the corporation be clearly limited to the reserve zones which are at present being exploited by the Fiscal Petroleum Establishment, to the zones which by application of the projected petroleum law are set aside as reserves, and to the vast zone at 50 km. wide along our borders which the constitution prohibits from being granted to foreigners by concessions."

President Bustamente y Rivero told congress that "in spite of the restrictions, which, during the war and under present circumstances are placed on imports of motorized vehicles and machinery, consumption has increased in such a manner that today it requires approximately half of our production, whereas before the war it only represented 21 per cent." Peruvian crude-oil production, he explained, has dropped 8 per cent and "must be viewed with concern by our patriotism."

"Fortunately, last year," the Peruvian president said, "success was obtained in 4 of the 29 exploratory wells drilled in Talara, which will permit us to maintain our production for the time being; but the government would be negligent of its duty if it left to chance such an important matter as the country's supply of petroleum products.

"For the above-mentioned reason, I ask congress again to give serious consideration to the 'ad referendum' contract covering the Sechura zone, which has been erroneously classified as a contract in favor of the International Petroleum Co., whereas actually by means of it the government has simply assured itself of a bidder who would be excluded by any other one making a better offer submitted in the public bids to be opened.

"My government believes that in view of the patriotic need of finding and developing rapidly new sources of petroleum production to assure the balance of our economy, the functioning of our transportation and industries and the requirements of national defense, the country cannot assume the additional risks which are inseparable from the petroleum industry; and that therefore the exploration and exploitation of that zone must be effected by a company well qualified by its technical and financial ability to carry them out in the minimum period and with the greatest possibilities of success."

The president declared that certain restrictive Peruvian legislation has been the cause in part for other countries forging ahead of Peru in the oil development.

"War of Nerves" Charged In Soviet-Iran Deal

THE Soviet Government is being accused of waging a "war of nerves" against Iran in order to bring about a favorable decision on the controversial Soviet-Iranian oil agreement.

In Tehran, Iran's capital, a diplomatic source said reports Kurdish tribesmen were assembling in northwest Iran "may be another move in the Soviet war of nerves on the eve of Parliament's consideration of the Russian-Iranian oil agreement."

The agreement was negotiated in April 1946 while Russian troops still occupied northern Iran. It would set up a joint company, 51 per cent Russian controlled the first 25 years, which would have concessions of five northern provinces. The agreement is now before the Iranian Parliament for approval. One member of parliament said only two supporters were found in an unofficial canvass of the legislative body. Prime Minister Ahmed Qavam has asked that the agreement be redrafted, but Russia is insisting on a vote, despite the near-certain prospect of defeat.

It was reported in Tehran that loyal Kurdish tribes had informed Iranian Army officials that Soviet agents and Barzani tribesmen were active in the northwest. Other reports said a Soviet force of possibly 30 divisions was maneuvering near the Iranian frontier.

Mexico Settles El Aguila Claim For $81,250,000

THE Mexican Government has settled for $81,250,000 the claim of El Aguila Petroleum Co. for the value of its properties taken over in the 1938 expropriation.

The settlement, announced in Mexico City by President Miguel Aleman, was reached after prolonged negotiations recommenced in February 1946. El Aguila, a subsidiary of Royal Dutch-Shell, held more than half of the foreign properties—producing, refining, and marketing—involved in the expropriation. El Aguila's holdings included a large part of Poza Rica field, Mexico's major producing area.

The agreement provides for 3 per cent interest since the time of the government seizure in 1938. British and Dutch officials representing the company had sought some $250,000,000 as compensation. Under the agreement, Mexico will have 15 years to pay the debt, based on United States currency. Two other Royal Dutch-Shell subsidiaries, San Cristobal and San Ricardo, boat-owning companies, were included in the settlement in addition to El Aguila.

In his statement, Aleman said the government had reached "a definite and final settlement of all the commitments made by the government when it expropriated the oil industry in the benefit of the nation. Negotiations were undertaken between the national oil administration (Petroleos Mexicanos) and representatives of El Aguila and its subsidiaries, directed to fixing the amount of compensation to be paid to these concerns. A satisfactory agreement was reached on the basis of a much lower and more just valuation of the expropriated properties than had been considered in prior negotiations."

The El Aguila claims $250,000,000 was approximately twice the amount asked by United States companies. The United States claims were settled for $23,995,991 plus interest.

Reports from Mexico City said Britain's desire for increasing its foreign trade with Mexico was a factor in bringing about the final settlement.

Trans-Arabian, Syria Agree on Pipe Line

CONCLUSION of an agreement by Trans-Arabian Pipe Line Co. for construction of its $150,000,000 crude-oil pipe line across Syria was disclosed September 1 in Damascus, Syria's capital.

The agreement between a representative of the pipe-line company and Syrian Premier Jamil Mardambey removed one of the last right-of-way obstacles for building the line which will bring Saudi Arabian crude oil to the Mediterranean coast. Trans-Arabian already has contract with Trans-Jordan, Palestine, and Lebanon.

Terms of the agreement with Syria were not immediately revealed. Only a few days earlier, however, reports from Jerusalem said the company was giving serious consideration to abandoning Lebanon as terminus of the line because of the delay in obtaining transit rights from Syria.

Syria and Lebanon had agreed to a division of benefits arising out of construction of the pipe line and a possible refinery at the terminus, but Syria sought additional concessions from Trans-Arabian, including $80,000 annual transit rental and 4 cents a ton royalty on all oil moving through the line in addition to $100,000 for transit rights. Syria also was reported asking allocation of some free oil to Syria, the use of a Syrian organization and some Syrian engineers in key posts of project.

A.I.O.C.'s May Output at 378,800 Bbl. Daily

Anglo-Iranian Oil Co., Ltd.'s May crude-oil production in Iran dropped to 1,525,000 tons (about 378,800 bbl. daily), compared with 1,605,000 tons (about 411,900 bbl. daily) for April.

Total crude-oil production for the first 5 months of this year was 7,587,000 tons (about 386,900 bbl. daily), compared with 6,053,000 tons (about 388,400 bbl. daily) for the first 4 months of 1947.

South American to Get Propane From Aruba

Facilities are now under construction and expected to be completed soon at Aruba, N.W.I. for the production and shipping of liquefied propane gas for regular shipments to Latin American consumers.

The propane will be used primarily in homes for gas ranges, refrigerators, and water heaters. Extensive use is predicted in industrial and commercial processes.

Work to Start Soon on New Abadan Plant

CONSTRUCTION of a 24,500-bbl. daily catalytic cracking plant at Abadan, for Anglo-Iranian Oil Co., Ltd., is scheduled to get under way immediately. Foster Wheeler Corp. is handling the work.

In connection with this cracking unit, a vapor-recovery plant will be built by E. B. Badger & Sons Co. This plant is expected to have a daily capacity of 20,000,000 cu. ft. of gas, and to turn out 9,000 bbl. of gasoline daily.

In addition to the 2,500-bbl. daily lubricating plant to be built at Haifa by Consolidated Refineries, Ltd. (which Anglo-Iranian owns jointly with Shell), A.I.O.C. plans to build a 400-bbl. daily lube plant at Abadan. The output of this plant, which will turn out finished lubricants, will be used mostly for local markets and possibly will provide small quantities for export.

Seventh Test Completed In Spring Hill Field

The seventh test well in Chile's Spring Hill field, Tierra del Fuego, has just been completed, but no flow test yet made. The eighth test well is now down to approximately 5,000 ft. Projected depth of these wells is 7,500 ft. Corporacion de Fomento de la Produccion expects a third rotary rig to be in operation soon in this field.

All producing wells to date have been capped due to lack of transportation. However, plans are under way for the construction of a pipe line.

U. K. Petroleum Board To Be Dissolved

The Petroleum Board, a voluntary association of distributing oil companies in the United Kingdom formed in 1938, is slated for dissolution December 31. It was formed because of the likelihood of war and was specified for dissolution not more than 2 years after the end of the state of emergency.

The dissolution of the Petroleum Board will not affect gasoline rationing in England. However, the minister of fuel and power proposes to set up a consumer's council for advice on questions concerning the use of oil.

PERU- *Oil Report*

Talara is the oil center of Peru. Adjacent to International's refinery is the big La Brea-Parinas producing area

Discussions of other current South American oil activities by the author have appeared in the Journal as follows: Colombia (fields and refineries) July 5; Colombia (exploration) July 12; Western Venezuela, August 2; Eastern Venezuela, August 23; Ecuador, August 30.

by Kenneth B. Barnes

International

PERU has important oil stature in being the only large petroleum producer on the west coast of South America. This position assumes greater significance when the great length of the total Pacific Coast line of South America is considered—some 5,000 miles. The Peruvian coast line itself stretches out about 1,400 miles.

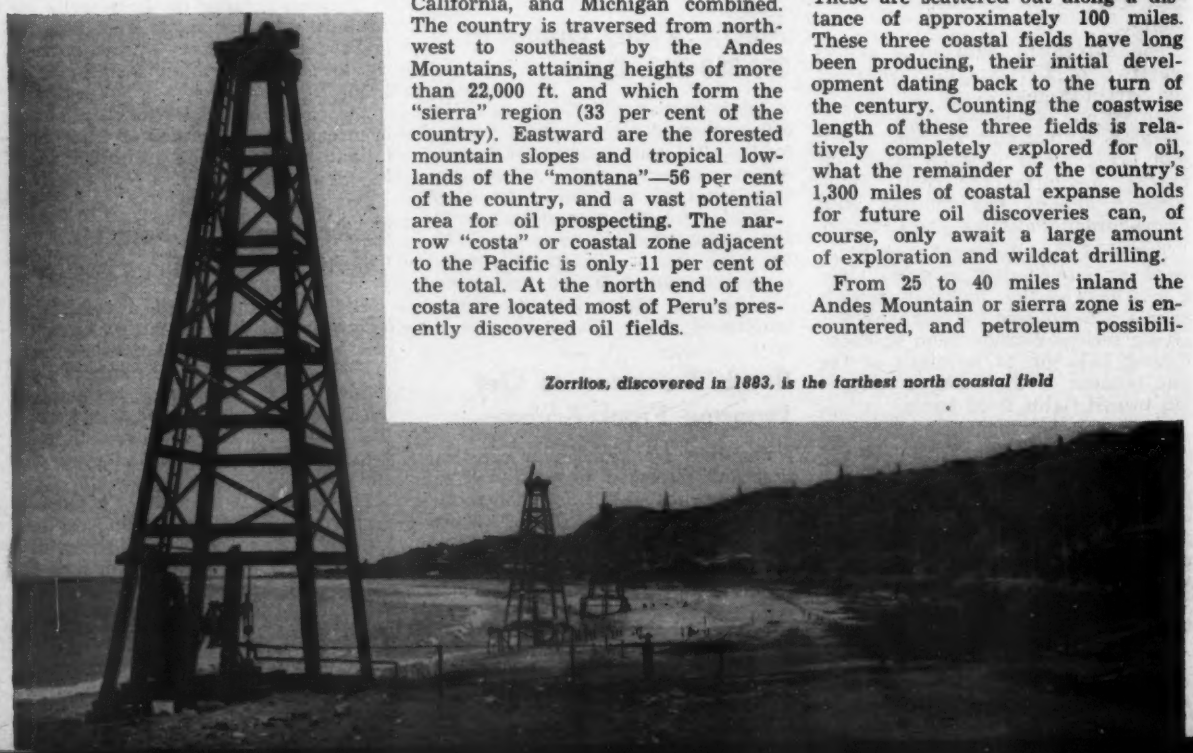
Peru has an area of 502,300 square miles—somewhat larger than Texas, California, and Michigan combined. The country is traversed from northwest to southeast by the Andes Mountains, attaining heights of more than 22,000 ft. and which form the "sierra" region (33 per cent of the country). Eastward are the forested mountain slopes and tropical lowlands of the "montana"—56 per cent of the country, and a vast potential area for oil prospecting. The narrow "costa" or coastal zone adjacent to the Pacific is only 11 per cent of the total. At the north end of the costa are located most of Peru's presently discovered oil fields.

The coastal zone is predominantly desert and rain seldom falls. Nevertheless, this region has a healthful, equable, and only moderately warm climate and is the chief economic factor in the country.

Peru's population is 7 million; unit of currency is the sol ($0.1538 U.S.); language is Spanish.

In the northern tip of Peru or within the Department of Pirua lie three of the country's four producing areas. These three areas are located immediately on the Pacific Ocean. They are, from north to south, Zorritos, Lobitos, and LaBrea-Parinas. These are scattered out along a distance of approximately 100 miles. These three coastal fields have long been producing, their initial development dating back to the turn of the century. Counting the coastwise length of these three fields is relatively completely explored for oil, what the remainder of the country's 1,300 miles of coastal expanse holds for future oil discoveries can, of course, only await a large amount of exploration and wildcat drilling.

From 25 to 40 miles inland the Andes Mountain or sierra zone is encountered, and petroleum possibili-



Zorritos, discovered in 1883, is the farthest north coastal field

View of some of the principal refining units at Talara

ties here are negligible, due to the igneous character of the mountainous region. On farther, however, in the montana zone, in the Department of Huanuco, is Peru's fourth producing area, Agua Caliente or Ganso Azul.

The vast montana zone, located as it is east of the Andes Mountains, presents tremendously difficult and expensive problems for future petroleum exploration and development. The area will be one of the most difficult in the world to develop for petroleum production because of dense jungle, swamps, low altitude, and tropical heat. Air transportation must be relied upon in the main, other than that offered by the navigable river systems. For the huge region very little detailed geological information is available and preliminary exploratory work must be done chiefly by aerial photography, airborne magnetometer, and geophysical prospecting mostly near the rivers.

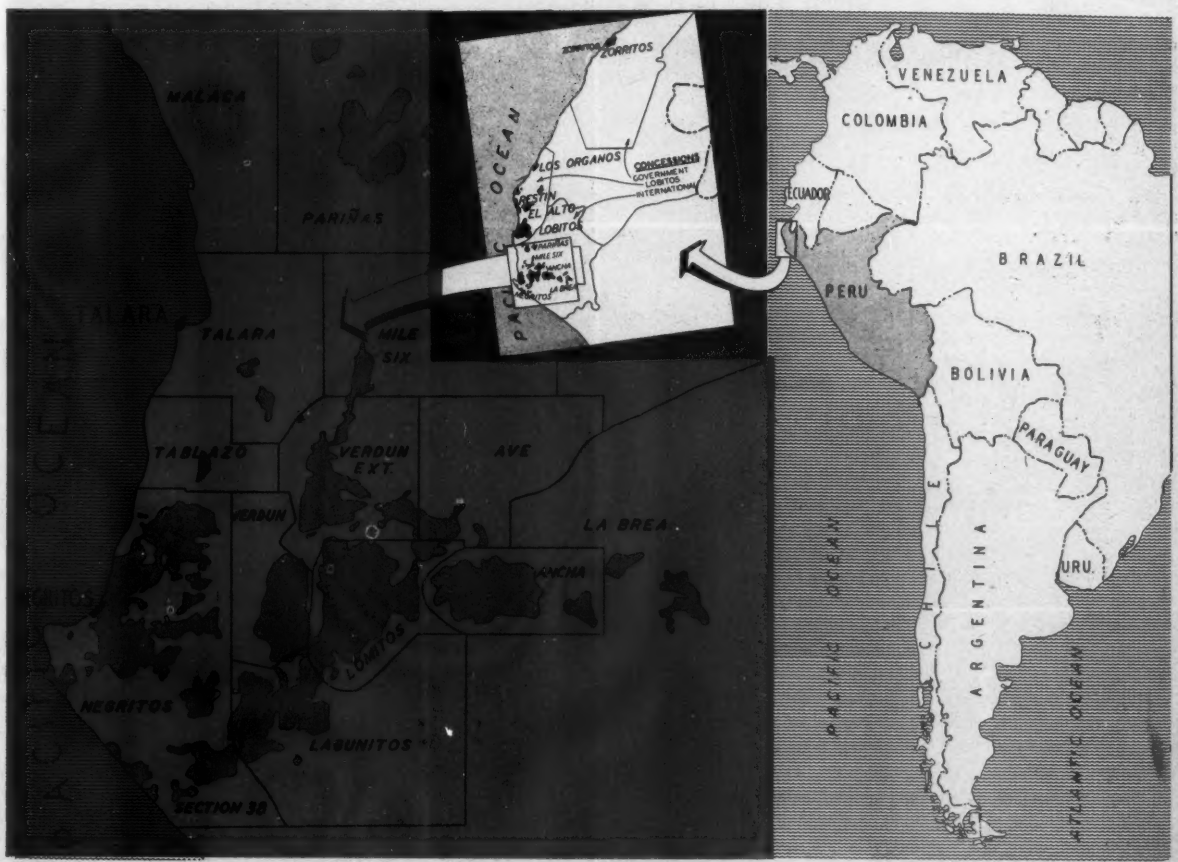
Refineries in Peru are four in number, and in each case they are located adjacent to the producing fields themselves—Ganso Azul in the montana zone, and at Lobitos, Zorritos, and LaBrea-Parinas on the northern coast. The refinery serving the La-Brea-Parinas production is situated at the harbor of Talara and the refining facilities there approximate 33,000 bbl. per day, depending upon the type of processing done.

Zorritos Operations

The Zorritos operations are government owned and operated under the direction of the Cuerpo de Ingenieros de Minos. Production is in the neighborhood of 300 bbl. per day, from some 50 pumping wells ranging in depth from 300 to 1,700 ft. The activity actually includes two fields, Zorritos which is 100 miles north of Talara, and the Los Organos or Constancia block located in a sector within Lobitos field.

A small 1,000-bbl. topping plant was constructed at Zorritos in 1940. It is charged with crude from the local wells plus royalty oil received from Lobitos. Gasoline, kerosine, diesel, and fuel oils are manufactured and shipped to the terminal at Cal-

Doubly expanded map of Peru's coastal fields, showing details of the heavily fault-blocked, multipay and multireservoir producing districts on the 411,500-acre La Brea-Parinas estate. Peru's coastal fields have produced to date 353,000,000 bbl. of crude



lao. Part of the products are consumed by government service organizations and the remainder placed on the open market. Further drilling is being done to expand the crude production supply in the Zorritos vicinity, and drilling projects also are contemplated on the concession held by government organization within the national reserve area in the montana zone, about 150 miles north of Agua Caliente.

Lobitos Operations

The Lobitos oil operations cover a 140,000-acre property handled by Compania Petrolera Lobitos, a subsidiary of Lobitos Oilfields, Ltd. There are two producing districts, Lobitos and Restin-El Alto. A total of about 1,200 wells have been drilled since the original discovery, and approximately 800 are in operation. New drilling as well as deepening work is carried on continuously by some 14 cable-tool rigs. A pipe line connects the fields to the Talara refinery of International Petroleum Co.

Approximately 10 per cent of the wells flow naturally. Central powers are used on most of the pumping wells, with some of the deep or isolated producers being equipped with individual units. A large electrical generating plant is installed at Restin-El Alto and the pumping there is completely electrified, while internal-combustion engines are used for the Lobitos pumping. Both fields have well-equipped machine shops.

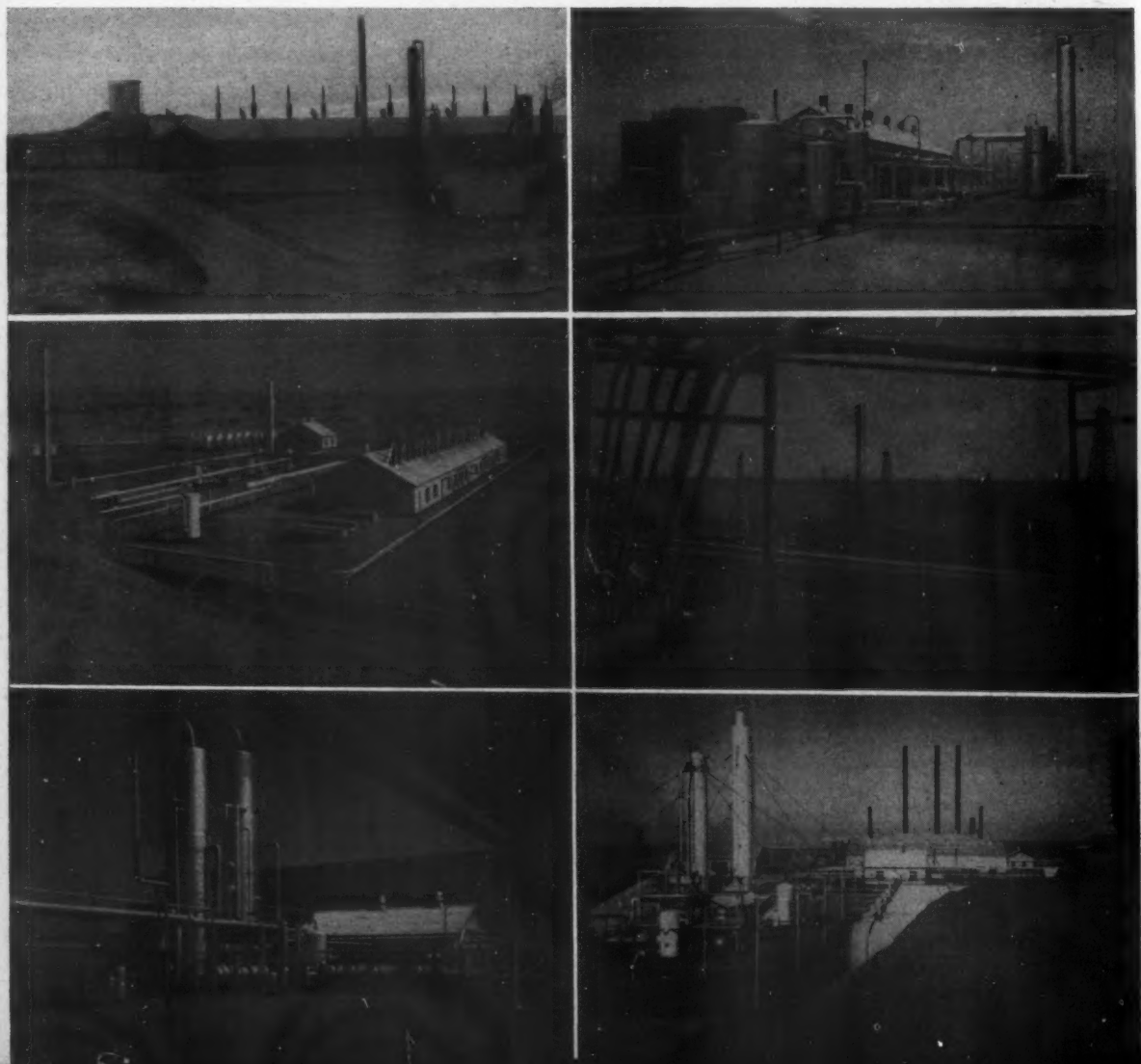
In Lobitos, a 14,000-gal.-per-day natural-gasoline plant is operated, with additions under way. Here also is located one of the two small topping plants which meet requirements of the concession for gasoline, kerosince, and diesel fuels. Company-built roads interconnect the well and plant of the two fields with headquarters at Lobitos on the Pan American Highway. Some 2,000 Peruvian nationals are employed on the 220-sq. mile property and Cia. Lobitos maintains housing, medical, recreational, and other facilities. There is a 100-mile narrow-gage railroad system connecting the loading docks with the drilling wells, gasoline plant, and machine shops.

International Petroleum Operations

Activities of International Petroleum Corp. in Peru are on a large scale and are completely integrated; that is, they include all divisions of the industry from initial exploration and drilling for crude oil through to the marketing of many kinds of finished petroleum products. To present adequately even general information, the divisions operated by this concern

(Continued on page 149)

One of the major long-time endeavors of International has been to conserve all gas produced from its Peruvian pools. The results have been outstanding in increasing ultimate crude oil recovery and saving large quantities of light hydrocarbons. These six gasoline plants are the central core of the work. Gas to the various injection wells in the different districts is at 450, 900 and 1,500 psi. Total installed compressor horsepower at these gasoline recovery-gas injection plants are: Mile Six 1,740; Parinas 4,290; Lagunitos 3,000; Lomitos 3,680; Ancha 1,380; High Verdun 2,070. Altogether there are 62 separate gas-compressor units



Many Companies Warning Against Installing Oil Burners

MANY oil companies are warning customers against making oil-burner installations because of the lack of any assured supply of fuel oil this winter for new equipment.

An official of the Oil and Gas Division of the Department of Interior made this statement in Washington August 29 as a result of inquiries sent the companies by Max Ball, division director.

Earlier, Ball directed a letter to a number of fuel-oil sellers asking them to inform him as whether they are advising the public that installation of oil burners is not feasible in view of the possibility of an inadequate supply of fuel.

No inquiry was made of gas-distributing companies in areas of possible short supply of gas, but Oil and Gas Division officials said the problem of conversions of coal to gas is almost as serious as that presented by the conversions to fuel oil. Several state regulatory bodies have permitted distributors of both oil and gas-burning equipment to say they would be unable to service new installations.

The Oil and Gas Division has made no direct attempt to curtail sale of oil-burning equipment, division officials said, but when specifically questioned, has advised against conversion to either gas or oil unless an adequate supply of fuel is assured. In some cases, advice has been given to change from oil to other types of equipment, such as that of burning coal.

In a statement in Washington on the eighty-eighth anniversary of the bringing in of the Drake well August 29, 1859, Ball said the winter fuel-oil situation "looks very tough," particularly for the Midwest as a result of lack of steel for additional refineries, tank cars, tank trucks, and drilling equipment. There is a possibility, he continued, that some Midwestern factories may be idle and homes cold for lack of fuel oil during the winter.

The U. S. Bureau of Census meantime reported information received from 163 manufacturers of oil-burning equipment showed a decline in new orders for oil-burning equipment. New orders received in June totaled 34,869 as compared with 106,579 in June 1946 and 5,959 in May, 1947. Production and shipments, however, of burners were continuing to increase. Production was 108,783 in June against 36,463 in June 1946 and 101,226 in May, and shipments were 105,251 in June 1947 against 36,745 in June 1946 and 99,171 in May 1947.

Plans Ready for A.S.M.E. Oil Conference

MECHANICAL engineering problems in all phases of the petroleum industry—production, transportation, refining, and equipment—will be discussed in a variety of technical papers to be presented at the annual Petroleum Mechanical Engineering Conference of the American Society of Mechanical Engineers October 6-8 at the Rice Hotel, Houston.

CARL E. REISTLE

Authors will be outstanding mechanical engineers representing a broad cross-section of the petroleum industry nationally. Carl E. Reistle, Jr., general manager of production operations, Humble Oil & Refining Co., will be conference chairman.

Registration for the meeting will open Sunday, October 5. Also on the program are field trips to inspect petrochemical installations in the Houston area.

Although the A.S.M.E. is sponsoring the conference, members of the American Institute of Mining and Metallurgical Engineers and the American Petroleum Institute are invited, and many are taking part in the meeting.

The program follows:

MONDAY, OCTOBER 6

10 a.m., Materials.—"Application and Handling of Foams," E. E. Kearns, Standard Oil Co. of Ohio; "Corrosion of Oil-Well Equipment," L. C. Case, Gulf Oil Corp.

10 a.m., Equipment.—"Accessories for Good Operation of Storage Vessels," F. L. Goldsby, Chicago Bridge & Iron Co.

12:15 p.m., Welcoming luncheon.

2:15 p.m., Transportation (Hydraulics).—"Heavy Crude Oil and Fuel-Oil Handling," E. L. Adams, General Petroleum Corp.; "The Application of New Designs in Plunger Pumps with Some Comments on Handling of Viscous Crudes," L. T. Gibbs, Aldrich Pump Co. and T. R. Aude, Stanolind Pipe Line Co.

2:15 p.m., Materials (welding).—"Study of Weldments in Alloy Steels and in Alloys," T. N. Armstrong, International Nickel Co., Inc.; "History of Some Austenitic (18-8) Furnace Tubes," C. S. Pugsley, Standard Oil Co. of New Jersey.

4:45 p.m.—Meeting of general committees on transportation and materials.

7 p.m.—Meeting of general committee on equipment.

8 p.m., Transportation (intermixing of products).—"Intersurface Characteristics of Products in Products Pipe Lines," S. S. Smith and R. K. Schultze, Shell Oil Co., Inc.; "Control of Comingling in Products Pipe Lines," E. A. Birge, Plantation Pipe Line Co.; also supporting papers from Sinclair Oil Corp. and Phillips Petroleum Co.

8 p.m., Refining (Internally insulated vessels).—"Internally Insulated Piping and Pressure Vessels for High-Temperature Service," P. E. Darling, Pan American Refining Co.; "Effect of Leakage Around Cross-Baffles in a Heat Exchanger," A. M. Whistler, C. F. Braun & Co.

TUESDAY, OCTOBER 7

9 a.m., Transportation (natural-gas transmission).—"Notes on Natural-Gas Transmission, Including Centrifugal Compressors for Natural-Gas Transmission," W. H. Stueve, Oklahoma Gas & Electric Co.

9 a.m., Production (Pumping).—"Comparison of Prime Movers for Pumping Wells," J. H. Field, Standard Oil Co. of Ohio; "Hydraulic Pumpers for Shallow Wells," A. A. Hardy, W. C. Norris Co.

11:30 a.m.—Meetings for general committees on production and refining.

2 p.m.—Inspection trips.

6 p.m.—"Get acquainted" party.

7 p.m.—Banquet.

WEDNESDAY, OCTOBER 8

9 a.m., Equipment (pressure-vessel design).—"Investigation of Stress in Vessels Under Internal Pressure," T. L. White, Commercial Shearing & Stamping Co.; "Manufacture and Application of Composite Plates," O. R. Carpenter, Babcock & Wilcox Co.

9 a.m., Production (drilling and casings design).—"Internal-Combustion-Engine Power Application for Rotary Drilling," W. S. Crake, Shell Oil Co., Inc.; "Some Factors Influencing Selection of Factors of Safety in Casing Design," E. N. Kemler, New York University.

12 noon.—Petroleum executive committee luncheon.

2 p.m., Production (Pumping).—"Free Pumping System," W. F. Slater, Kobe, Inc.; "Subsurface Sucker Rod and Gas Lift Pumps," R. L. Chenault, Oil Well Supply Co.

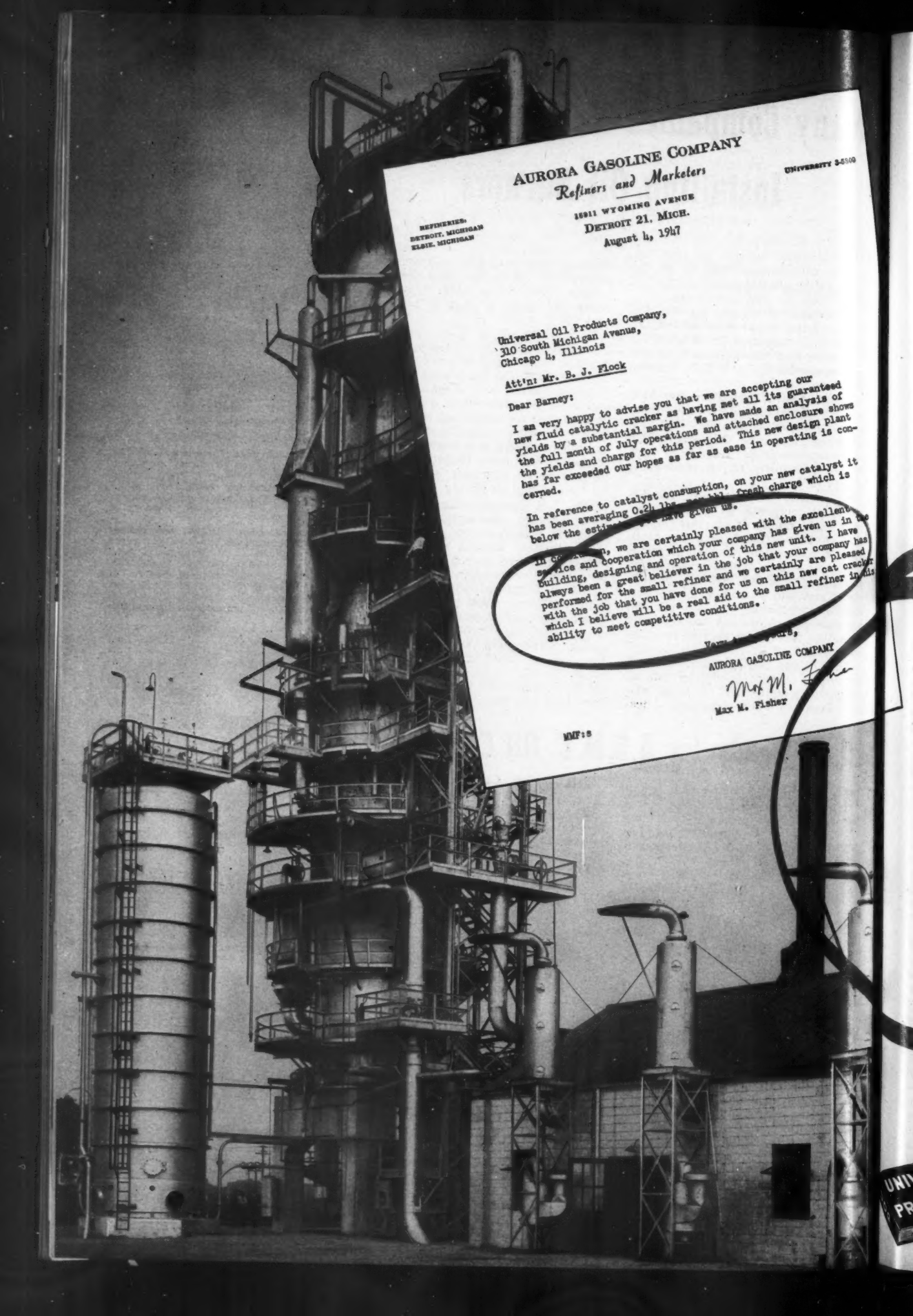
Crude Output, Gasoline Production Sets Record

A CRUDE-OIL production of 5,172,490 bbl. daily the week ended August 30 and an output of 16,539,000 bbl. of gasoline from refineries the week of August 23 represent two more new records for the oil industry.

The new all-time high crude production as shown in The Oil and Gas Journal's weekly tabulation, was an increase of 18,530 bbl. daily over the previous week. At the same time, three states made new all-time highs—Colorado, 47,110 bbl. daily; Louisiana, 437,400 bbl. daily, and Mississippi with 100,055 bbl. daily *(for other states, see pages 146-47).*

California's daily average of 927,900 bbl., was a new 1946-47 high. Oklahoma also set a new 1946-47 record with 393,250 bbl. daily. Kansas production reached its highest figure since 1943 with a daily average of 303,750 bbl.

The American Petroleum Institute's report for the week ended August 23 showed that gasoline production of 16,539,000 bbl. was 22,000 bbl. over the previous high the week of August 2.



AURORA GASOLINE COMPANY

Refiners and Marketers

REFINERIES:
DETROIT, MICHIGAN
ELSIE, MICHIGAN

16911 WYOMING AVENUE
DETROIT 21, MICH.

UNIVERSITY 3-4900

August 4, 1947

Universal Oil Products Company,
310 South Michigan Avenue,
Chicago 4, Illinois

Att'n: Mr. B. J. Flock

Dear Barney:

I am very happy to advise you that we are accepting our new fluid catalytic cracker as having met all its guaranteed yields by a substantial margin. We have made an analysis of the full month of July operations and attached enclosure shows the yields and charge for this period. This new design plant has far exceeded our hopes as far as ease in operating is concerned.

In reference to catalyst consumption, on your new catalyst it has been averaging 0.2[illegible] lbs. per bbl. fresh charge which is below the estimate [illegible] have given us.

In closing, we are certainly pleased with the excellent service and cooperation which your company has given us in the building, designing and operation of this new unit. I have always been a great believer in the job that your company has performed for the small refiner and we certainly are pleased with the job that you have done for us on this new cat cracker which I believe will be a real aid to the small refiner in his ability to meet competitive conditions.

Very truly yours,

AURORA GASOLINE COMPANY

Max M. Fisher

Max M. Fisher

MMF:s

MAX M. FISHER

VICE-PRESIDENT, AURORA GASOLINE COMPANY, DETROIT

IN ACCEPTING THE NEW UOP IMPROVED FLUID CATALYTIC CRACKING UNIT

Says:

"...we certainly are pleased with the job that you have done for us on this new cat cracker which I believe will be a real aid to the small refiner in his ability to meet competitive conditions."

UNIVERSAL OIL PRODUCTS COMPANY

General Offices: 310 S. MICHIGAN AVE. UOP CHICAGO 4, ILLINOIS, U. S. A.

LABORATORIES: RIVERSIDE, ILLINOIS

Where Creative Thinking Impels Progress

WASHINGTON WATCHING

BY HENRY D. RALPH

Decision Awaited

WASHINGTON.—After 8 weeks of continuous hearings the Federal Power Commission has now taken all the testimony anyone cared to offer on the application of Texas Eastern Transmission Corp. to acquire and operate the Government-built Big Inch pipe-line systems. Oral argument has been set for September 22, and an early decision is expected since FPC waived the usual requirement for filing briefs.

As the final witness, R. H. Hargrove, president of Texas Eastern, told the commission that the company has all the requisites of a pipe-line company—gas supplies, marketing contracts, skilled personnel, and capital, and that as soon as a permanent certificate is issued it will complete its financing program and begin installing additional equipment.

Under its temporary lease and operating certificate, Texas Eastern is moving about 140,000,000 cu. ft. of natural gas daily from Texas and Louisiana into the Appalachian area to supplement the supplies of various distributing companies. FPC has already authorized the installation of four compressor stations which will increase deliveries to 265,000,000 cu. ft. by November 1, and it is planned to have six more compressors in service by February 1948, which will give the two lines a capacity of 340,000,000 cu. ft.

Additional Compressors

If FPC issues a permanent certificate promptly, the company expects to have an additional 11 compressors in operation by August 1948, which will bring the system to its full rated capacity of 433,000,000 cu. ft. per day. All but 13,000,000 cu. ft. of this total are already under contract for delivery as soon as construction is completed, with 340,000,000 cu. ft. scheduled for the Appalachian region and 80,000,000 cu. ft. for the Philadelphia area. The 20 and 24-in. lines will be interconnected and operated as a looped system between their convergence at Little Rock, Ark., and Philadelphia. There are no definite plans at present for using the New Jersey sections of the lines, originally built to carry oil from Texas to New York.

Financing plans are completed, and an application will be filed with the Securities and Exchange Commission as soon as FPC issues the certificate. Dillon, Read & Co. of New York will underwrite a bond issue of $120,000,000 and will handle the sale of $32,000,000 in stock of Texas Eastern. By 1950, Hargrove estimated, the company will have an over-all capital investment of $170,000,000, including the $143,127,000 purchase price from War Assets Administration, and the cost of conversion from oil to gas and construction of short spur and distribution lines.

Wherry's Investigation

SEN. KENNETH WHERRY (Rep., Neb.), head of the petroleum subcommittee of the Senate and small-business committee, has scheduled three more hearings in his investigation of charges independent oil dealers are being "squeezed" out of business during the current period of tight supply.

The senator announced public hearings will be held September 24 in Omaha, September 26 in Kansas City, and September 29 in Tulsa. First of the recess hearings took place August 21-22 in Chicago.

In scheduling the hearings, Wherry repeated his statement that "certain practices by major oil companies and their integrated operations are causing practical elimination of the smaller independent business man at every level in the oil industry."

Clean-Cut Evidence Missing

A great many complex elements are involved in the problem being investigated by Wherry, and oversimplification of the case is easy. Most large midwestern suppliers are allocating their products on a previous-year basis, but charges of discrimination are almost inevitable in the situation.

The Senate committee, of which Wherry is a part, acts as a sort of guardian father to the smaller segments of American business, and the subcommittee is certain to give a sympathetic ear to complaints of the independent jobbers and dealers.

The first hearing *(The Oil and Gas Journal, August 30, page 38)* failed to produce any clear-cut evidence that major companies, acting either individually or in concert, are out to eliminate smaller marketing units.

Allocation of supplies by company action is admittedly undesirable, but it can also be conceded that any action of the Government to ration products in the oil-short Midwest would be worse. Best hope of the industry is for speedy completion of the necessary transportation and refining facilities which would provide an adequate flow of products into the region.

Courtship of the Voters

THE current antitrust drive of the Department of Justice and oil-marketing investigation of the Senate small business committee have a common objective in view—the 1948 presidential election.

The high cost of living is certain to be a political issue, and both Democrats and Republicans will attempt to make capital of their own remedies. President Truman, having failed in his attempt to "talk prices down," is getting set to lay the blame on "monopolies" and big business in general. This has always been a popular issue and the Democrats were not figuring on getting votes from big business anyway. The antitrust division, with more funds for the current fiscal year than ever before, is preparing a big trust-busting campaign which will reach a peak next spring and summer, just in time for the political season. The oil industry is by no means the sole target, but it certainly will not be overlooked.

But the Republicans don't intend to be put in the position of the defenders of big business, so there will be more investigations like the oil hearings in Chicago conducted by the Senate's Republican whip, Wherry of Nebraska. The GOP will try to paint itself as the defender of small business and free private enterprise, and congressional investigating committees will attempt to outdo the Justice Department in showing up the evils and abuses of concentrated economic power.

Wherry's committee staff is continuing to receive and investigate complaints from independent marketers that their supplies are being cut off. By late fall, the fuel-oil pinch may be on, and the committee can work up a report which will have good political and climatic timing for the January session of Congress.

Political considerations also can be expected to influence the investigation of cooperatives scheduled by two House committees for this fall. The big co-ops which are cutting into the oil and other industries are largely farmer-owned, and farmer organizations are generating much political pressure to keep these investigations held down to the level of noncommittal probes of previous years. Since the Republicans can't afford to alienate the bulk of the farm vote just before the 1948 election it would not be surprising if the co-ops investigations fail to live up to their advance billings.

Uncertain Directorship

THE Bureau of Mines now has a new director, but the length of his tenure is uncertain.

He is Dr. James Boyd, former dean of the Colorado School of Mines. He is serving under a recess appointment, which means that if he is not confirmed by the Senate at the next session of Congress he will have to give up the post.

President Truman sent Boyd's name to the Senate last spring when Dr. R. R. Sayers, who had been director of the Bureau of Mines for more than a decade, resumed his former career with the U. S. Public Health Service. The nomination was violently attacked by John L. Lewis, president of the United Mine Workers, who insisted that coal mine safety was the most important task of the Bureau and that Boyd was incompetent for the job. The committee on public lands recommended confirmation, but the Senate failed to act.

When Boyd was sworn in under his recess appointment the U.M.W. again took a crack at him, at Secretary of the Interior Krug, and at President Truman, presaging a bitter fight when the nomination comes up in the Senate next year.

D. C. Price Inquiry

THE federal grand-jury investigation of gasoline prices in Washington is a purely local affair at present and there are no plans for enlarging its scope beyond the District of Columbia and adjacent marketing territory. But if the prosecution is successful the Department of Justice might easily use the case as a precedent for similar action in other jurisdictions.

Witnesses being taken before the grand jury are local and regional sales managers for all major oil companies marketing in the area, and officers of the local Retail Gasoline Dealers Association. They have been asked about the prices of various grades of gasoline in recent months as compared with previous years, sources of supply, marketing practices, leasing terms of major distributors, and evidence of collusion among competitors or pressure of major companies in setting retail prices.

Department officials insist the investigation is a local matter prompted by a number of specific complaints from dealers in the area and is not directly related to general increases in petroleum products prices nor to shortages which have squeezed independent dealers in some areas. Actually, there have been no shortages in the Washington area, and retail price increases here have been less than in some parts of the country. But what the department finds out about marketing practices might be used elsewhere for a repeat performance on a larger scale—provided its case here stands up.

Surveying the Shelf

THE Continental Shelf has been put on the shelf by the U. S. Geological Survey, and the once ambitious plans to make a thorough survey of the underwater domain have been put off to the indefinite future.

Soon after President Truman issued a proclamation asserting government ownership of the bed of what had formerly been considered international waters, USGS began planning a survey to discover what oil and other things of value might be located. It worked up a 5-year program of airborne-magnetometer surveys, depth sounding, and even underwater exploration with new devices. But the Bureau of the Budget refused to ask Congress for $1,500,000 to start the work and has again declined to put the project into the budget it is now preparing for the next fiscal year.

This project had no direct bearing on the tidelands issue since the Continental Shelf proclamation included the ocean bottom beyond the boundaries claimed by the several states. USGS figured that since it was federal property the Government ought to explore it and perhaps even develop it. But oil companies experienced in offshore development were cool to the idea, saying that if and when they are interested they will make their own surveys of the ocean bottom.

Oil Offices in Washington

NOW that government war agencies are contracting a bit and moving out of rented quarters in Washington's office buildings, oil companies and associations are able to expand their Washington offices, and the Commonwealth Building at 1625 K Street appears to be a magnet for many of them.

The Petroleum Industry War Council maintained its headquarters in this building, and after the war its space was taken over by the American Petroleum Institute. Within the next few weeks this building will also be the Washington address for the National Petroleum Council, the Mid-Continent Oil and Gas Association, Phillips Petroleum Co., and Sun Oil Co., all of which are cramped in their present quarters.

Connally Act Enforcement

PROCEDURES for enforcement of the Connally "Hot Oil" Act have been reorganized by the Oil and Gas Division to conform to the appropriation of $175,000 allotted for this purpose for the current fiscal year by the Interior Department appropriation bill as finally enacted by Congress.

On the new basis the Federal Petroleum Board and its staff will consist of a total of about 30 persons, including 16 examiners, whereas a year ago there were 44 persons including 23 examiners. During the late spring and early summer, when the amount to be appropriated was in doubt, it was necessary to furlough or dismiss all but seven employes in the field, but many of these have now been reemployed.

Because of the reduced funds the Corpus Christi office has been closed and the remaining personnel are being assigned to the offices at Houston, Kilgore, and Midland, Tex., and Lafayette, La. These offices examine reports of oil producers to see that shipments of crude in interstate commerce do not exceed the production allowables assigned to individual wells by the Texas Railroad Commission, and make spot field checks as an aid to enforcement of state conservation laws.

Public-Relations District Studies Advertising Plan

A cooperative newspaper advertising campaign, which would be sponsored by a number of participating oil companies and tied into the national advertising program of the oil-industry public relations program, is under consideration by the industry's public-relations committee in Oklahoma and Kansas.

The proposed cooperative advertising campaign would be the first of its kind inaugurated by any district organization in the nation-wide public-relations program.

Plans for such a campaign, including a 13-week schedule of advertising together with approximate costs, were presented August 27 at a meeting of the Oklahoma division of the district in Tulsa. It was again discussed at a meeting of the Kansas division in Wichita the following day.

On recommendation of William T. Payne, Big Chief Drilling Co., Oklahoma City, and Oklahoma chairman, a committee to study the plan was authorized at the Tulsa meeting. Another committee to consider a Kansas advertising campaign was set up at the Wichita meeting.

The appointment of Luther T. Williams, public-relations director of Sunray Oil Corp., as chairman of the district advertising committee was announced at the Tulsa meeting. John E. Chandler, manager of Independent Refiners Service Corp. and editor of its publication, "The Sovereign Schroll," was named to head the Kansas division of the committee.

Texas Standard Moves Offices

Standard Oil Co. of Texas has moved its offices in Houston from the Petroleum building to two floors of the new City National Bank building.

Check THESE 11 "PRECISION" FREAS firsts

FIRST to manufacture commercially, standard laboratory ovens, started in 1907 by Dr. Thomas B. Freas.

FIRST with the Mechanical Convection Type of Laboratory Oven.

FIRST to engineer a special Heavy Duty Tubo Blower to make mechanical convection practical.

FIRST to use All Stainless Steel Interiors—the finest protection against usual corrosive oven vapors.

FIRST to use Hydraulic Thermostat, which assures positive, accurate control of temperatures.

FIRST to build constant temperature equipment fine enough to be backed by a five year guarantee!

FIRST to use a Terminal Block with all electrical connections made outside of oven!

FIRST to use adjustable air damper to vary air-flow in working chamber as standard equipment!

FIRST to use heaters of low wattage density, ribbon type, allowing large expanse of heat dissipating surface, assuring top efficiency at Black Heat!

FIRST to use an all welded heater bank —no screws or nuts to work and cause an open arc!

FIRST to use High Thermal Efficiency Fibre Glass Insulation!

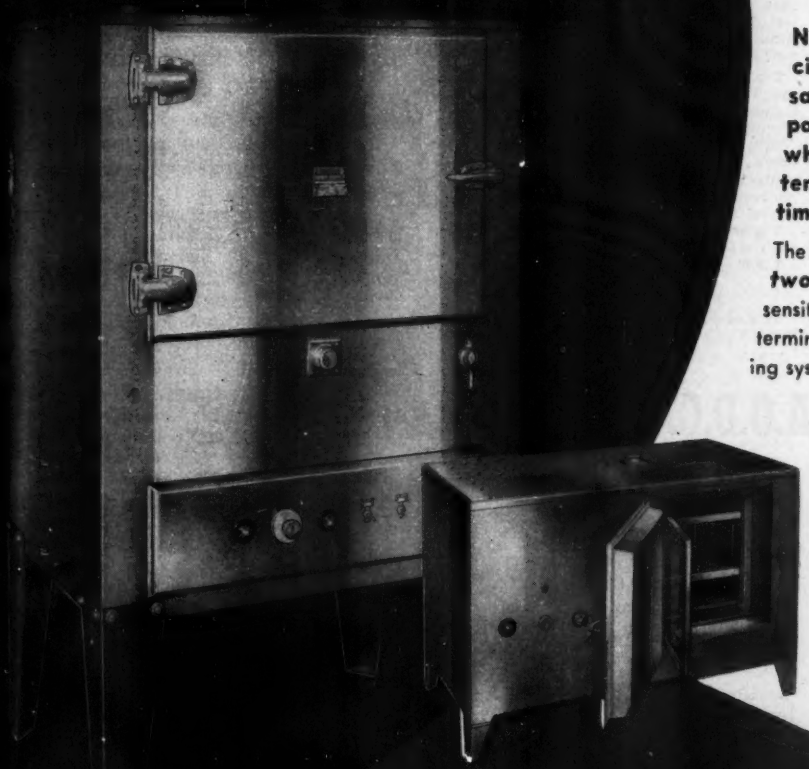
They have been setting oven performance records in laboratories for almost 40 years. They are your guarantee that every feature found in "Precision"—Freas Constant Temperature Equipment has been tested and proved . . . not in an engineering department . . . nor in a factory testing line . . . but right in the largest and most efficient laboratories in the country. Consider this when you purchase your oven . . . your choice of "Precision" — Freas Equipment means years of efficient, dependable, trouble-free service . . . backed by a positive five year guarantee. Be sure you specify "Precision"—Freas when you purchase your next constant temperature unit.

Precision Scientific Company

3737 WEST CORTLAND STREET — PRECISION PS SCIENTIFIC — CHICAGO 47, ILLINOIS, U. S. A.

Scientific Research and Production Control Equipment

NOW! "PRECISION" Presents The HYDRAULIC DUAL THERMOSTAT



New, Positive, Accurate, the "Precision" Dual Thermostat gives added safety, prevents loss of time and is particularly useful in those tests which require maintaining constant temperatures over long periods of time.

The "Precision" Dual Thermostat consists of **two** complete thermal control systems; two sensitive elements and two capillaries each terminating in a separate bellows and switching system. If for any reason the master control system becomes inoperative, the auxiliary takes over and maintains the oven temperature. A single micro-adjustment knob, graduated in both Fahrenheit and Centigrade, governs both control and auxiliary systems. The Dual Thermostat is standard equipment on all "Precision"—Freas mechanical convection ovens, and can be installed on gravity convection ovens at slight additional cost. The Dual Thermostat carries the regular "Precision"—Freas 5 yr. guarantee.

...n this NEW "PRECISION" ... your laboratory, and ... run constant ...345.

Varied Program Scheduled for Annual N.P.A. Meeting

REFINING technology, oil industry economic and labor-relations problems as well as several subjects of general public interest are scheduled on the program of the forty-fifth annual meeting of the National Petroleum Association September 17-19 at the Hotel Traymore in Atlantic City.

General sessions are scheduled the afternoon of Wednesday and Thursday, September 17-18. Mornings are devoted to group meetings of various departments and committees of the association.

Speakers for the general sessions include Alexander Sachs, New York economist who during World War II was a member of the Petroleum Industry War Council. He will discuss the current supply and demand situation in the oil industry and the general economic outlook with reference to the industry's future developments. Among other general session speakers are Robert T. Haslam, vice president and director, Standard Oil Co. (N. J.); James A. Perkins, vice president, Swarthmore College; and Robert G. Dunlop, president, Sun Oil Co.

The program for the meeting follows:

WEDNESDAY, SEPTEMBER 17

10 a.m., group meetings.—Public relations operating committee; subcommittee on taxation, American Petroleum Industries Committee; conference of department of fire and safety, American Petroleum Institute lubrication committee.

11 a.m., board of trustees.

2 p.m., general session.—President's welcome, J. B. Fisher, NPA president; "Freedom Is What You Make It," Robert T. Haslam, vice president, Standard Oil Co. (N. J.); "The Economic Future of Europe," James A. Perkins, vice president, Swarthmore College; "The Postwar Economy and the Oil Industry," Alexander Sachs, economic adviser, New York; report of nominating committee and election of trustees.

8 p.m., board of trustees.

THURSDAY, SEPTEMBER 18

10 a.m., group meetings.—Joint meeting, department of standards and tests and department of manufacture, Joseph E. Keller presiding. "Gas-Oil Polyforming," W. C. Offutt, M. C. Fogle, Paul Ostergaard, and H. Beuther, Gulf Research & Development Co.; "Trends in Motor Fuels," H. R. Wolf, General Motors Research Laboratories; "New Aspects of Pour-Depressant-Treated Oils," C. E. Hodges, chief chemist, Paraflow Laboratory, Standard Oil Co. of New Jersey. Department of traffic and transportation, Harry S. Elkins, presiding, "The Proposed Rewrite of the Transportation of Explosives Act," Frank Perrin, executive assistant to the director, Office of Defense Transportation; "Analysis of the Railroads' Case for Another Rate Increase," Harry S. Elkins. Department of industrial relations, Donald C. O'Hara presiding. Round table, "New Collective Bargaining Contracts in the Petroleum Industry," refineries: Richard H. Lowe, counsel, Socony-Vacuum Oil Co., Inc., New York; tank-truck drivers, bulk station, and terminal employes: Benjamin R. Miller, director of labor relations, American Trucking Association, Washington. Lubrication committee, A.P.I.

2 p.m., general session.—"The Effect of the Taft-Hartley Act on Bargaining Negotiations and Grievance Procedures," panel discussion, Gerard D. Reilly, Washington; "Oil's Open Door," Robert G. Dunlop, president, Sun Oil Co.; "The Lubrication Committee, A.P.I., Its Organization and Objectives," D. P. Clark, Gulf Oil Corp., committee secretary.

5 p.m.—Social event, host, Houdry Process Corp.

7 p.m.—Annual banquet.

FRIDAY, SEPTEMBER 19

10 a.m.—Annual breakfast party, host, Ethyl Corp.

Program Set for A.A.O.D.C. Convention

THE American Association of Oilwell Drilling Contractors will gather in Long Beach, Calif., October 13-15 for the association's seventh annual convention.

Association members and others interested in drilling operations from all parts of the country are expected to be represented at the meeting. A special train is being organized to run from Dallas to Long Beach.

The program includes several discussions of technical problems involved in drilling operations. Also scheduled are talks on labor relations and the situation in regard to drilling equipment. Gov. Earl Warren of California will speak at the banquet.

Several tours to points of interest in the Long Beach area are being organized. Committees are arranging for a special presentation of the process by which oil is recovered from under the City of Long Beach by directional drilling.

Members of the central committee for the convention are K. L. Kellogg, E. C. Brown, D. H. Graham, R. W. Marshall, E. F. Simonis, and Gene Reid. Other committees and their chairmen are: housing, D. H. Graham; entertainment, George McCarthy; banquet, Dick Pettijohn; finance, R. W. Marshall; program, A. S. Hayes; transportation, C. L. Fowler; registration, Gene Reid; publicity, D. H. Graham and F. A. York; and technical, T. E. Pike.

The program follows:

MONDAY, OCTOBER 13

Morning.—Committee meetings. Brunch for ladies at Lakewood Country Club at 10 a.m.

Noon.—Luncheon and welcome address by Mayor Chase of Long Beach.

Afternoon.—"Oil Development in Long Beach Harbor Area," John Rembaugh and Frank Hardesty, Long Beach Harbor Department. Stag tour of Long Beach Harbor.

Night.—Free for open house, supper parties, etc.

TUESDAY, OCTOBER 14

Morning.—Report of committees.

Noon.—Luncheon.

Afternoon.—"Automatic Drilling Control," Martin E. True, Humble Oil & Refining Co.; "Effect of Hole Enlargement of Cementing and Completing Practices," Bruce Barkis and K. A. Wright, B. & W., Inc. Tour of movie studios and radio broadcast for ladies. Directors meeting.

Night.—Stag barbecue at Lakewood Country Club.

WEDNESDAY, OCTOBER 15

Morning.—"The Drilling-Equipment Situation," A. W. McKinney, National Supply Co.; "Manners of Management," John M. Forline, labor-relations consultant.

Noon.—Luncheon and installation of officers.

Afternoon.—"Fundamental Considerations in the Design of Rock Bits and Tool Joints," Wiley B. Noble, Reed Roller Bit Co.; and feature address by speaker to be announced later.

Night.—Cocktail party. Banquet, speaker, Gov. Earl Warren of California.

Whiting Refinery Fire Costs 24,000 Bbl. Daily

A loss of 24,000 bbl. daily in crude distillation was suffered by Standard Oil Co. (Ind.) in an explosion and fire at its Whiting (Ind.) refinery August 28.

The fire was the second in 3 weeks at the refinery and damage was estimated at $75,000. The first fire also caused a 24,000-bbl. daily capacity shutdown, which will not be back in operation until October 1.

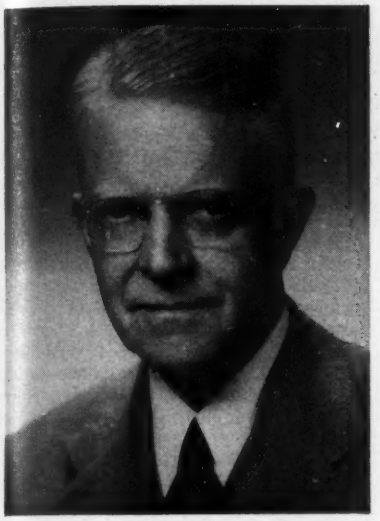
Many weeks will be required to repair the damage which comes at a time when all refinery facilities are needed to cope with record breaking Midwest demand for petroleum products.

The recent fire resulted from an explosion in the pump house serving Nos. 5 and 6 stills and was brought under control in 2 hours. One employe was killed, and three received minor injuries.

Louisiana Offers Leases

The Louisiana State Mineral Board on September 10 will offer 25 tracts of state-owned lands and water bottoms for lease. These tracts are located in Iberia, Avoyelles, Acadia, St. Charles, Jefferson, St. Bernard, Plaquemines, Bossier, Bienville, Catahoula, Concordia, St. Martin, and La Fourche parishes.

PERSONALS



Wide Experience Behind New Engineering Chief

J. M. EVANS, new chief engineer of Standard Oil Co. of California, joined the company in 1915 immediately after his graduation from the University of California.

At college, he won a letter in athletics and served as campus correspondent for various newspapers. He took his B.S. degree in civil engineering.

Evans left Standard of California for military service in World War I. He rose to the rank of captain and returned to the company's engineering department in 1920. Since that time he has been associated with Standard of California's engineering and construction activities.

In succeeding years he held a wide variety of positions. In 1929, he was made head of the civil-engineering division of the company's engineering department. In 1943 he was named assistant to the chief engineer, and a year later assistant chief engineer.

As chief engineer and chairman of the board of engineers of the company, Evans succeeded H. H. Hall, now a director and vice president of Trans-Arabian Pipe Line Co. Hall is continuing with California Standard as consulting engineer.

A. J. Perks, in charge of research for Iraq Petroleum Co., Ltd., Tripoli, Lebanon, and **J. Hopkinson,** field production manager for the company at Kirkuk, Iraq, have returned to New York after a field trip to the oil areas of the Southwest and Middle West. They have been identified with oil operations in the Middle East for several years.

Dr. E. S. Merriam, Marietta, Ohio, engineer in the field of gas byproducts and a natural-gas consultant, has joined the faculty of the Marietta College School of Petroleum on a part-time basis. He will teach courses in engineering materials, gas production, distribution, and utilization.

Ralph S. Jackson, vice president of Independent Exploration Co., Houston, has resigned effective September 15 and will open an office at Beeville, Tex., as consulting geophysicist.

Kraus Earhart, supervisor of the safety division, The Texas Co., has been promoted to be a representative in foreign operations.

Robert W. Hendee, president of the Colorado Interstate Gas Co., has accepted a 6-year membership on the board of trustees of Colorado College, Colorado Springs.

Robert O. Burkett, formerly with Oklahoma Natural Gas Co., has been named geologist for Sunray Oil Corp., Tulsa.

Max B. Zall has been named to succeed **Lafayette M. Hughes** who recently resigned as a member of the Colorado State Gas Conservation Board.

P. C. Spencer, former general counsel of Sinclair Oil Corp., has been named president of Sinclair Refining Co. He succeeds **H. F. Sinclair** who recently resigned but who will retain the presidency of Sinclair Oil Corp. Spencer became affiliated with the oil industry in 1922 when he joined Producers & Refiners Corp. In addition to his activities in the oil business, Spencer has held executive positions in several natural-gas companies for a number of years, including presidency of Southwestern Development Co. and Canadian River Gas Co., a vice presidency and directorship of Colorado Interstate Gas Co. With the acquisition of the Prairie companies, of which Producers & Refiners Corp. was a subsidiary, Spencer became active in the Sinclair organization, moving to New York in 1934. He was elected general counsel of the corporation in 1946.

R. H. McKinley, formerly with Magnolia Petroleum Co., Dallas, has joined Panhandle Refining Co.'s geological staff at Wichita Falls, Tex., succeeding **W. J. Fowler,** resigned.

William M. Fleetwood and **Gordon D. Fleetwood,** Tulsa oil operators, have moved to Denver, where they have set up offices. **Charles O. Hile,** geologist and geophysicist of Boulder, Colo., will be associated with the Fleetwood organization.

Stanley Bird and **L. S. Ridgway,** both in the foreign marketing division of Standard Oil Co. (N.J.), recently returned to the United States after a business trip to Latin America. Bird made an extensive survey of automotive transportation conditions in Brazil while Ridgeway visited various marketing areas in Venezuela and Jamaica.

O. W. Rosenbauer, foreign marketing division, Standard Oil Co. (N.J.), left the United States late in August for a business trip to Venezuela, Trinidad, and Puerto Rico.

R. S. Miesse and **Hal D. Hughes,** California oil operators, plan to open an office at San Angelo, Tex., by October 1 and will be associated with **Hunter Woodruff** of Coleman, Tex.

Paul M. Waddill, manager of licensee service section of Phillips Petroleum Co.'s chemical engineering department, has been appointed to act as liaison for the company's refining department with other refiners. Waddill is a graduate of Oklahoma A. & M. College with a B.S. degree in chemical engineering in 1931. He joined Phillips in 1934 and has worked as engineer, process engineer, process foreman, and manufacturing superintendent.

O. M. Jaco, superintendent of Ohio Oil Co.'s pipe-line department, Martinsville, Ill., recently accepted on behalf of the company a citation from the American Legion commending the organization for its work in reemployment of veterans.

Geoffrey H. Stokes, former administrative assistant to **A. J. Galloway,** Shell Oil Co., Inc., Houston, has accepted a new assignment with the Shell group. He will be located permanently in the London office after a tour of the Shell operations in the United States, South America, and other foreign areas. Stokes will be replaced by **Barclay Van Dyke** who has been in the personnel and industrial relations department in New York.

PERSONALS

Thomas M. Hogan, petroleum engineer for The Texas Co. at San Angelo, Tex., was scheduled to leave September 1 for Saudi Arabia where he will be production superintendent for the American-Arabian Oil Co.

Eugene Holman, president of Standard Oil Co. (N.J.), headed a party of officials of Jersey Standard and affiliated companies which flew from Denver to inspect operations in Alberta. The party included **H. C. Weiss,** Houston, president, Humble Oil & Refining Co.; **O. C. Schorp,** Tulsa, president, Carter Oil Co.; **A. T. Proudfit,** Caracas, Venezuela, president, Creole Petroleum Corp.; **H. H. Hewetson,** president, **J. R. White,** vice president, **Dr. O. B. Hopkins, G. L. Stewart, M. L. Haider, T. A. Link, W. D. C. McKenzie,** and **S. R. Stevens,** all of Imperial Cil, Ltd.; **J. K. Crane** and **L. F. McCollum,** New York, both of Jersey Standard; **Hines Baker** and **L. T. Barrow,** Houston, Humble vice presidents; and **H. F. Moses** and **R. D. Sloan,** of Carter Oil, Tulsa.

Gerald P. Nelson, assistant manager in Shell Oil Co., Inc.'s manufacturing department at its Martinez (Calif.) refinery, has been promoted to senior technician in the head office. Other manufacturing department promotions of the company include: **Samuel B. Thomas,** department manager, Wilmington (Calif.) refinery, to assistant manager, development, head office; **W. F. Greene,** analyst, control laboratory, Martinez refinery, to head inspector; **J. V. Putman,** head inspector, control laboratory, Martinez refinery, to laboratory foreman; **W. K. Smith,** department manager, Coalinga, Martinez refinery, to senior technologist; **Clarence G. Petersen,** senior technologist, head office, to assistant department manager, Wilmington refinery.

TURNER NAMED TO HEAD PAN AMERICAN COMPANIES

D. J. SMITH

H. DECKER

J. M. VETTER

E. W. KRUG

Edd R. Turner, former first vice president and general manager of Pan American Production Co., Pan American Pipe Line Co., and Pan American Gas Co., with headquarters in Houston, has been elected president and a member of the board of directors of the three companies. He succeeds **D. J. Smith** who has been elected president of the parent corporation, Pan American Petroleum & Transport Co.

EDD R. TURNER

Turner is also president and a member of the board, Fairfax Oil Co., another Pan American subsidiary. After having been with The Texas Co. and Continental Oil Co. for a total of 20 years Turner joined the Pan American companies July 1, 1935. He was made vice president of the Pan American production and pipe line companies in 1939 and when Pan American Gas was formed in 1941 he was made vice president.

Harold Decker, former assistant manager of the Pan American companies, was elected vice president and general manager of Pan American Production Co. and Pan American Gas Co., while **Ira O. Walker** was elected vice president and general manager of Pan American Pipe Line Co. Decker, who joined the Pan American companies in February 1945, has been in the oil business since 1925 when he was with Rio Bravo Oil Co. Before joining the Pan American companies he was with Seaboard Oil Co. as a district superintendent. Walker was formerly with Lago Petroleum Corp., a subsidiary of Pan American Petroleum & Transport Co., in Maracaibo, Venezuela. Later he worked for Shell Oil Co., Inc., in Louisiana and in 1936 he again joined Pan American companies.

John M. Vetter, former superintendent of the land and geological department of Pan American Production Co., has succeeded Decker as assistant manager of that company and of Pan American Gas. He is one of the original employes of Pan American Production Co., having joined as chief geologist in August 1935.

E. W. Krug has been appointed general superintendent of Pan American Pipe Line Co. to succeed Walker. Krug, former superintendent of the southern division of that company, was in charge of all petroleum transportation activities of the Seventh U. S. Army in Europe in World War II. He joined Pan American in April 1936.

E. T. Martin, office manager of Pan American Production Co., has been elected assistant secretary of Pan American Production and of Pan American Gas. **G. J. Smith,** former assistant superintendent of the land and geological department, has been appointed superintendent of the new exploration department to supervise all geological and geophysical activities of Pan American Production, while **Haymond Willis,** former assistant superintendent of the land and geological department, has been appointed superintendent of the land department of the company. **Alfred W. Lott,** former evaluation engineer of Pan American Production Co., will serve as administrative assistant to Harold Decker. **E. J. Tennyson,** former division foreman of the Pan American Pipe Line Co.'s southern division, has been promoted to superintendent.

Dr. Robert E. Wilson, chairman of the boards of the three subsidiary companies, has resigned and has been succeeded by D. J. Smith, new president of Pan American Petroleum & Transport Co. Wilson is chairman of the board of Standard Oil Co. (Ind.). **A. W. Peake** and **B. F. Jones,** directors and officers of Standard Oil Co. (Ind.), have resigned as directors and officers of the three subsidiaries of Pan American Petroleum & Transport Co.

Charles H. Wagner, president of American Oil Co., succeeds the late E. G. McKeever as director of the parent company, Pan American Petroleum & Transport, while **A. A. Corona** was elected vice president and **J. A. Carroll, Jr.,** a director and vice president and treasurer of the company, was named a member of the executive committee.

P. J. Sweeny, plant manager of the Texas City refinery of Pan American Refining Corp., was elected a director, first vice president, and a member of the executive committees of Pan American Refining Corp. and Mexican Petroleum Corp. of Georgia. **T. E. Sunderland,** general counsel of Pan American Petroleum & Transport Co., and **A. A. Corona** and **L. W. Moore,** assistants in charge of manufacturing, were also elected to the boards of the two companies. **H. Maupin** was elected a director of the Pan American Pipe Line Co.

PERSONALS

Verne O. Henderson, former senior clerk with General Petroleum Corp., has been appointed safety engineer for the pipe-line department.

Oakley M. Turner has been appointed industrial relations assistant for the transportation department and the supply and distribution department of Sohio Pipe Line Co.

R. M. Miilu, vice president of California Commercial Co., Inc., a subsidiary of Standard Oil Co. of California, has been transferred from New York to San Francisco.

Joseph E. Meehan, vice president of Pure Transportation Co., will return to the Chicago headquarters after a 3-month leave to take up the advanced management course at Harvard University. **William F. Stebbins,** assistant to Meehan, will become superintendent of the Illinois division of Pure Transportation Co. and manager of the crude-oil purchasing division, effective September 15. **Richard M. Pemberton,** district gager foreman, will become assistant superintendent of Pure Transportation Co.'s Illinois division, effective September 15.

David H. Sears, exploration department of Shell Oil Co., Inc., has been transferred from Ventura, Calif., to Los Angeles. Two other geologists who were transferred were: **Robert L. Sprinkel,** from Sacramento, Calif., to Ventura, and **Lyle W. Smith,** from Ventura to Sacramento. In the production department, **George L. Baker** has been promoted to senior surveyor in Los Angeles. Other production department transfers include: **David C. Edmondson,** senior draftsman, Los Angeles to Long Beach, Calif.; **Charles Hansen,** drilling foreman, Oilfields to Ventura; **Roy E. Robinson,** drilling foreman, Oilfields to Sacramento; **Urban M. Warren,** drilling foreman, Bakersfield to Sacramento.

Bruce Cumming, Shell Chemical Corp. maintenance foreman at Torrance, Calif., has been named senior engineering inspector at Houston. Other recent Shell Chemical personnel changes: **A. N. Holcombe,** senior technologist, San Francisco, to chief chemist, Shell Point; **J. Levada,** assistant chief engineer, Houston, to senior engineer, Torrance; **N. H. McKay,** technologist, San Francisco, to assistant department manager, Dominguez, Calif.; **P. T. Vockel,** special assignment, San Francisco, to office manager, New York; **W. C. Bevil,** office manager, Shell Point to Houston; **A. M. H. Dierl,** technologist, Torrance to Shell Point; **W. C. Hanson,** office manager, from Torrance to Shell Point; **G. F. Johnson,** acting chief chemist to chief chemist, Houston; **F. H. McGregor,** office manager, Houston to New York; **A. P. Towell,** engineering inspector, Torrance, to chief engineering inspector, Houston; **R. E. Wright,** senior chemist to chief chemist, Shell Point; and **J. W. Eberman,** department manager, Torrance, to senior engineer, Houston.

SHIFTS—

G. P. Atkinson, engineer, Shell Oil Co., Inc., Magnolia, Ark., to Houston; **Stanley C. Weber,** superintendent, Buffalo Pipe Line Co., Lancaster to Holmes, Pa.; **John E. McCall,** geologist, The California Co., La Junta, Colo., to Durant, Okla.; **Kenneth A. Gorton,** geologist, General Petroleum Corp., Sheridan, Wyo., to Grand Junction, Colo.; **Bradford C. Adams,** geologist, The Texas Co., Redlands to Altadena, Calif.

W. K. Barry, engineer, Superior Oil Co., Long Beach, Calif., to Chickasha, Okla.; **Joseph K. Kellogg,** engineer, K. L. Kellogg & Sons, Long Beach to Compton, Calif.; **C. R. Allen,** superintendent, Continental Oil Co., Pasadena, Calif., to Los Angeles; **Merrill M. Menshaw,** engineer, The Texas Co., Daisetta, Tex., to Houston; **Lawrence W. Coldren,** superintendent, Pure Oil Co., Lufkin, to Livingston, Tex.; **Gustave S. Hughes,** engineer, Magnolia Pipe Line Co., Merkel to Andrews, Tex.

Sandy Vanderburg, engineer, Magnolia Pipe Line Co., Seven Sisters to Sundown, Tex.; **W. J. Wranosky,** engineer, Magnolia Petroleum Co., Alice to Premont, Tex.; **Anthony T. Pall,** engineer,, The Texas Co., El Campo to Daisetta, Tex.; **D. R. Staples,** engineer, The Texas Co., Freer to Alice, Tex.; **John A. Newman,** engineer, Shell Oil Co., Inc., Houston to Kilgore, Tex.; **John L. McCray,** engineer, Shell Oil Co., Inc., Kilgore to Quitman, Tex.

Robert D. Page, foreman, Stanolind Oil & Gas Co., Pampa to Levelland, Tex.; **R. D. Wroten,** engineer, Union Producing Co., Pettus to Tyler, Tex.; **O. G. Gage, Jr.,** engineer, Gulf Refining Co., Buras to Harvey, La.; **G. B. Wooster,** superintendent, Cities Service Refining Co., Sulphur to Lake Charles, La.

Paschal Martin, engineer, Pure Oil Co., Chicago to Olney, Ill.; **William H. Roe,** engineer, Superior Oil Co., Crossville, Ill., to Newaygo, Mich.; **H. K. Kerr,** foreman, Kerr-McGee Oil Industries, Inc., Ardmore, Okla., to Mansfield, La.; **R. G. Scott,** superintendent, Sinclair Prairie Oil Co., Kiefer to Cleveland, Okla.; **H. L. Davis,** superintendent, William Brothers Corp., Idabel, Okla., to Flora, Ill.

DEATHS

Curtis L. Henderson, 56, president of Vickers Petroleum Co., Inc., since 1940, died August 26 in Wichita. He was former president of the Western Petroleum Refiners Association from 1940 to 1946 and was widely known in oil circles throughout the United States. A graduate of the University of Tennessee, he held three degrees in electrical and mechanical engineering. In 1910 Henderson entered the utility field when he became associated with Henry L. Doherty & Co. at Denver. He served on the Petroleum Industry War Council and the National Petroleum Council. He was a director of the American Petroleum Institute, Independent Petroleum Association of America, Associated Industries of Kansas, and the Kansas State College Research Foundation. Henderson was also a member of the American Institute of Mining and Metallurgical Engineers and the American Society of Mechanical Engineers.

Paul B. Mason, 70, former Tulsa oil attorney and previously associated with the Sinclair Prairie Oil & Gas Co.'s legal department, died August 26 in Independence, Kans.

Oliver H. Holloway, 74, retired oil operator, died August 23 in Weimar, Tex.

Homer H. Adams, 65, former Fort Worth geologist, died August 26 in Abilene, Tex.

E. M. Showalter, Jr., 40, executive in the advertising department of Standard Oil Co. (N.J.), died August 20 in Portland, Me. He joined the company in 1927.

James A. Richie, 73, treasurer of Dominion Natural Gas Co. and of the Natural Gas and Petroleum Association of Canada, died recently in Buffalo, N. Y.

Frank R. Parker, 57, Texas oil operator, died August 26 in Houston.

Earle W. McMullen, director of research for Eagle-Picher Co. and prominent in engineering chemistry, died August 26 in Pittsburg, Kans.

The mass spectrometer breaks up hydrocarbon gas molecules by smashing them with electron bullets. Each gas (methane, ethane, etc.) breaks up into its own peculiar pattern of fragments, so many pieces of each weight (mass). The instrument then sorts and counts the pieces of each weight. On this page is the artist's concept of what happens and the kind of record each of seven gases makes. Table 1 gives statistical data for these illustrations.

by Charles J. Deegan

ometer

THE mass spectrometer, to the ordinary oil man, and even to many technically trained individuals in the industry, is a large and mysterious gadget that costs a lot of money and does some kind of very valuable work, through some sort of complicated scientific manipulations. This is true despite the fact that there are over 40 of these units now in use in the petroleum industry.

Many an executive, after listening to reasons why his company should spend $30,000 to $50,000 for an instrument, plus the laboratory space, and perhaps other equipment, sums up his impressions about like this:

"The mass spectrometer seems to be an expensive instrument, based on some high-brow scientific principles, that:

"1. Solves problems that can't be solved by any other method, or

"2. Solves problems so much quicker than any other method, that it saves enough time to pay for itself, or

"3. Although there are other methods to solve some of our problems, they take too long to be of any use in checking operating processes. This mass spectrometer equipment gives us the answer in time to make some of the necessary adjustments in operating processes."

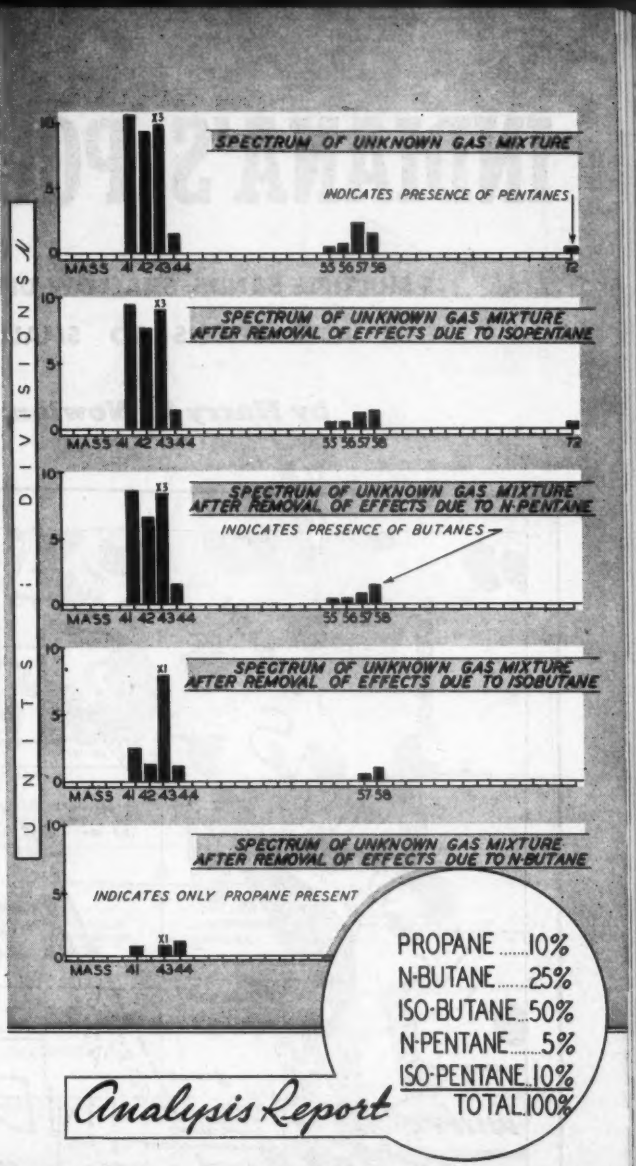
As a matter of fact, getting too deeply involved in the

fundamentals of how and why the mass spectrometer works is useless. Beyond a certain point, the scientists themselves are not too sure. The practical answer is that it does work very satisfactorily for a lot of purposes; gives answers that are urgently needed; and gives them with a very high degree of accuracy. The accuracy is ample, not only for plant processing needs, but also for a large field in fundamental research.

For the layman, a not too technical explanation is that it is simply a piece of apparatus that fires electron bullets at molecules of gas, thereby smashing the molecules into fragments. It then collects the fragments, sorts them out by weights (more technically by mass), and counts the number of different fragments of each weight (mass).

It gives practical results because under controlled conditions, when hit by an electron bullet, a molecule of any particular kind of hydrocarbon gas always breaks up into the same number and weights of fragments. A molecule of methane gas will always break up into one pattern. A molecule of ethane, or any other hydrocarbon gas, will also always break up into a set pattern. But the pattern, or distribution of numbers and weights (mass) of a smashed ethane molecule will be distinctively different from the pattern of a smashed methane molecule. Propane, butane, etc., each breaks up into its own pattern,

(Continued on page 91)


UNITS : DIVISIONS
SPECTRUM OF UNKNOWN GAS MIXTURE
INDICATES PRESENCE OF PENTANES
SPECTRUM OF UNKNOWN GAS MIXTURE AFTER REMOVAL OF EFFECTS DUE TO ISOPENTANE
SPECTRUM OF UNKNOWN GAS MIXTURE AFTER REMOVAL OF EFFECTS DUE TO N-PENTANE
INDICATES PRESENCE OF BUTANES
SPECTRUM OF UNKNOWN GAS MIXTURE AFTER REMOVAL OF EFFECTS DUE TO ISOBUTANE
SPECTRUM OF UNKNOWN GAS MIXTURE AFTER REMOVAL OF EFFECTS DUE TO N-BUTANE
INDICATES ONLY PROPANE PRESENT
MASS 41 42 43 44
35 36 57 58
72
Analysis Report
PROPANE 10%
N-BUTANE 25%
ISO-BUTANE ... 50%
N-PENTANE 5%
ISO-PENTANE ... 10%
TOTAL 100%

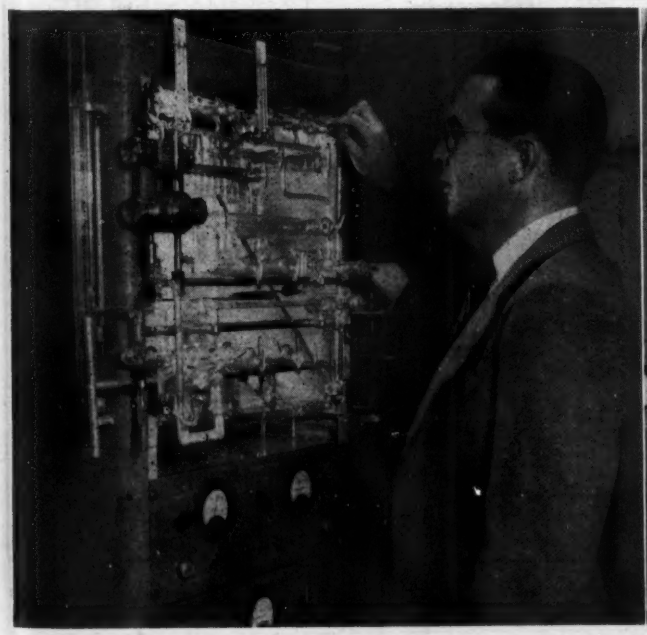
Right: Analyzing an unknown gas mixture from a mass-spectrometer recording. (Statistical data given in Table 2.) Presence of mass (weight) 72 proves pentanes present (see Table 1). After removing proportionate units of other weights accounted for by, first isopentane, then n-pentane (note values for pentanes in Table 1 for masses 41 through 58), there are still units of 58 weight present, proving butanes must be present (see Table 1). Repeating process of removing proportionate units of masses 41 through 58 for first isobutane, then n-butane, leaves a pattern that can only be pure propane. Masses on scale from 15 through 30 omitted from illustration for simplification

THE PHOTOGRAPHS

Opposite page: Operator scanning a mass spectrum on Model 21-102 Consolidated mass spectrometer

Below, left: Gas-inlet cabinet, showing sample introduction apparatus and automatic protective circuits

Below, right: Electronic circuits inside of panels. Easy accessibility of parts is stressed



INDIANA'S POCKET—

ITS MULTIPLE SANDS, SHALLOW DEPTH, LOW COSTS OFFER ATTRACTIONS TO SMALLER OPERATORS

by Harry H. Nowlan

THIS article by a well-known Evansville, Ind., geologist gives a brief but comprehensive picture of an oil-producing area that, in his opinion offers attractive possibilities for further development by small independent operators. The combination of local shortages of crude and products in the Midwest plus the location of the area discussed, makes the article of more than usual interest and timeliness.

Map of Indiana Pocket area, showing location of producing fields, and dashed line indicating direction of electric-log cross-section shown on opposite page

THIS article deals with an area of Indiana in the southeastern part of the Illinois basin sometimes referred to by oldtimers as the "Pocket" and situated in a V-shape in the southwest corner of the state bounded on the south by the Ohio River and Kentucky and on the west by the Wabash River and Illinois. Evansville, Ind., a city of 125,000 people, is the financial center of this region.

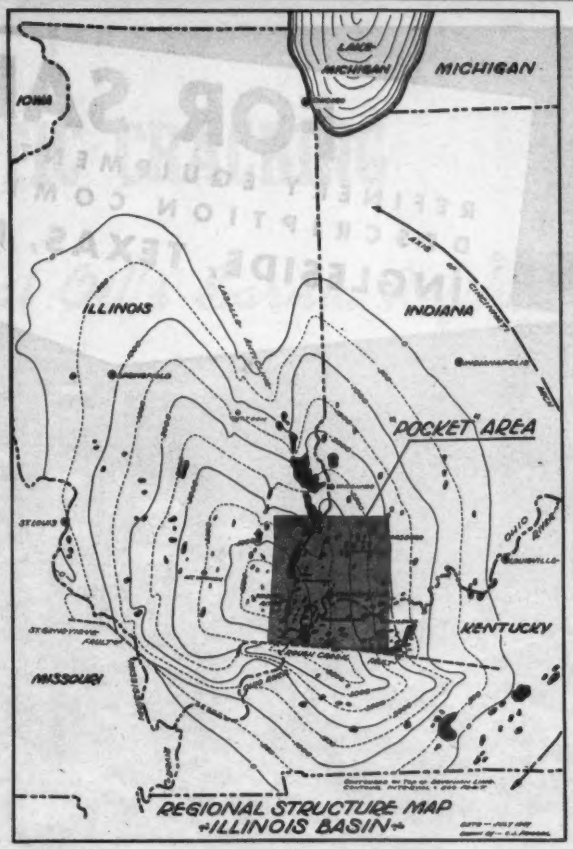
There are about 2,000 sq. miles, or 1,200,000 acres, available for exploration at completion costs ranging from $5,000 to $25,000 per well. The maximum number of pay horizons shown in our schedule of pools (Table 1) is 10. However, the total number of possible pay horizons, including numerous lenticular sands that are found at various localities, is probably nearer 20 down to and including the McClosky lime of depths of 1,500 to 3,000 ft., depending upon the location of a particular well.

It is hoped, with a minimum of words and the use of explanatory maps and a simple composite geologic cross-section, to present a reasonably clear picture of the interesting shallow productive possibilities of the area.

Production Data

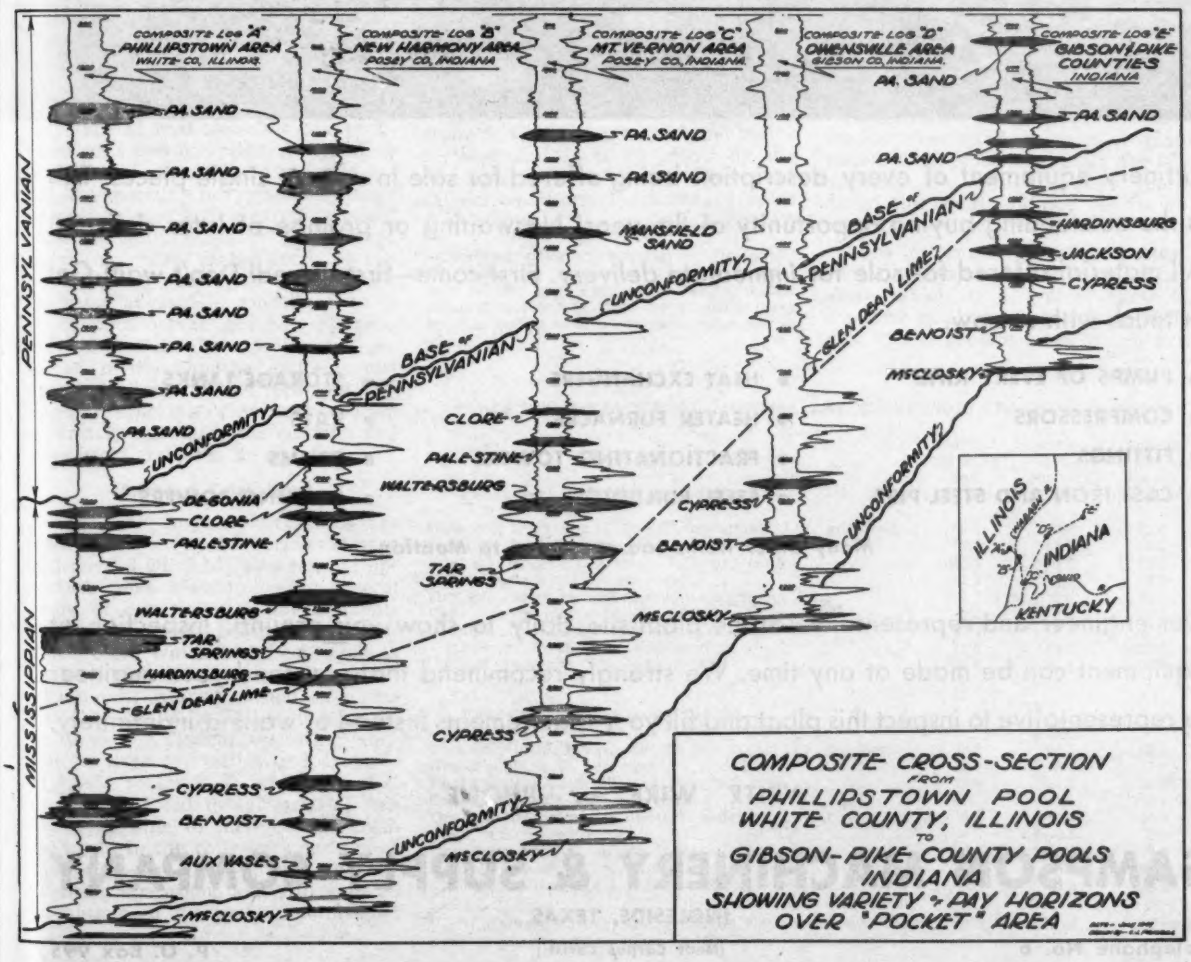
Production records are not available from 1906 to 1938. There are, however, numerous old wells in the shallow areas of Pike and Gibson counties that are now producing

(Continued on page 91)



Right: Illinois basin regional contour map; shaded area indicates territory referred to in this article

Below: Composite electric-log cross-section of Pocket area showing variety of pay horizons found at various places



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SUSPENSOID CATALYTIC CRACKING

at Imperial Oil's Sarnia Refinery

by C. H. Caesar*

THE fundamental features which distinguish the suspensoid catalytic cracking process from all other commercial processes for the catalytic conversion of hydrocarbons are the utilization of very small quantities of catalyst and the absence of special reactors. Powdered catalyst, in the form of an oil slurry, is charged with the feed to a conventional type of thermal cracking coil and the catalyst is recovered from the product tar by filtration, after which it may be regenerated and reused. Between 2 and 10 lb. of catalyst per barrel of total feed are customarily employed. Simplified flow diagram and descriptions of the accessory equipment may be found in the literature.[1,2]

A wide variety of feed stocks, ranging from naphtha to heavy gas oils and cycle stocks, may be processed in a single refinery unit. The flexibility of the suspensoid cracking operation together with its simplicity is particularly valuable in small refineries. Any type of feed stock may be processed provided complete vaporization in the coil is attained. In order to assist in vaporizing heavy stocks it may be desirable to add a carrying agent such as naphtha, water, propane, or butane fractions to the feed. It has been found, however, that when cracking at severe conditions to a given pool octane number, appreciably higher distillate yields are obtained if the naphtha and gas oils are charged as a mixed feed to a suspensoid cracking unit rather than separately reforming the naphtha and suspensoid cracking the gas oils.[3]

Refinery Operations

Plant-scale suspensoid cracking has been conducted at the Sarnia refinery of Imperial Oil, Ltd., as a normal operation since 1940, following several years of experimental developments by the company. Natural and activated clays which had been used to contact treat lubricating oils provided low-cost catalysts which were sufficiently active to meet current requirements. Typical operating conditions were coil outlet temperatures of 1,045° to 1,055° F. and coil outlet pressures of 350 to 450 psig. It was found possible to increase the fresh feed rate to the coils over and above that used in the previous thermal cracking operations and still gain an advantage in the octane number of the distillate produced, of approximately 8 points by the A.S.T.M. motor method, and 11 points by the C.F.R. research method.

Appreciable yields of propylenes and butylenes were also produced. This feature of the process was utilized when the rubber emergency arose during the war, and the Dominion Government built a synthetic-rubber plant at Sarnia. To supply the maximum quantity of butylenes for this plant the severity of cracking in the suspensoid operations was further increased, with coil-outlet temperatures ranging from 1,080° to 1,090° F. and somewhat reduced feed rates. Simultaneously, of course, increased octane numbers were realized on the gasoline produced. Typical yields from these operations are given in Table 1. It will be noted that when polymer gasoline was included in both processes, the suspensoid operations gave increased yields of gasoline with octane numbers ranging from 9 to 12 points by the motor method, and 12 to 16 points by the research method, above those obtained by thermal cracking similar feed stocks in the same equipment.*

*By increasing the severity of the naphtha reforming operation, the octane numbers of the pool gasoline produced in the thermal case could have been raised three to four points with a corresponding loss in yield.

These years of commercial operation demonstrated that the process was thoroughly sound and practical for routine commercial operations. The various mechanical difficulties which arose in the development of the process were eliminated or reduced to such negligible proportions that service factors equal to those attained in thermal cracking operations were realized.

Pilot-Plant Tests with Synthetic Catalysts

While the product quality obtained in the above refinery operations using natural clays, once through, is adequate for present-day requirements, it was realized that future developments would result in a demand for gasoline with octane numbers which could only be obtained by the use of highly active cracking catalyst. Such catalysts, of course, would be regenerated and recycled to the process.

Experiments in this field were most readily conducted in a pilot plant which was especially built for the purpose, and which closely reproduced the conditions and results obtained in the full scale units.

Runs in the pilot plant demonstrated that the utilization of fresh 3A catalyst, which is a typical synthetic cracking catalyst commercially available at the present time, would pro-

TABLE 1—COMPARISON OF THERMAL AND SUSPENSOID CRACKING RESULTS

	Thermal cracking and reforming	Suspensoid cracking*	
		Normal operations	Severe operations
Yields excluding polymer gasoline—			
Gasoline, 10-lb. R.v.p., 400° F., end point, L.V. per cent	56.1	52.3	53.0
Heating oil, L.V. per cent	12.7	12.7	5.1
Fuel oil, 10° A.P.I. gravity, L.V. per cent	25.6	20.2	19.0
Excess butane,† L.V. per cent	1.3	4.5	6.0
Dry gas (propane and lighter), weight per cent	6.7	12.5	20.4
Coke, weight per cent	0.3	0.2	0.2
Gasoline: A.S.T.M. motor O.N. unleaded	65.4	73.2	75.0
C.F.R. research O.N. unleaded	71.0	82.0	85.0
C.F.R. research O.N. +3 cc. TEL	84.8	91.4	94.0
Yields including polymer gasoline—			
Gasoline, 10-lb. R.v.p., 400° F. end point, L.V. per cent	58.3	58.6	62.8
Heating oil, L.V. per cent	12.7	12.7	5.1
Fuel oil, 10° A.P.I. gravity, L.V. per cent	25.6	20.2	19.0
Excess butane,† L.V. per cent	Nil	Nil	Nil
Dry gas (propane and lighter), weight per cent	5.9	10.5	16.8
Coke, weight per cent	0.3	0.2	0.2
Gasoline: A.S.T.M. motor O.N. unleaded	66.6	75.5	78.1
C.F.R. research O.N. unleaded	72.6	85.1	89.0
C.F.R. research O.N. +3 cc. TEL	85.6	93.2	96.2

*Catalyst—Natural and activated clays from lube contacting 2 lb./bbl. of feed. †Excess over requirements to make 10 lb. R.v.p. gasoline.

*Imperial Oil, Ltd.

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duce gasolines having clear octane numbers approximately two points higher than those obtained when cracking to the same conversion* with the natural and activated clays from lube-oil contacting. Product distributions at a given conversion were essentially the same using either catalyst. When including nonselective polymer gasoline (produced from the propylene and excess butylenes) gasoline yields of 61 per cent were obtained from Mid-Continent-Louden feed stocks composed of 25 per cent of heavy naphtha and 75 per cent of mixed gas oils. The A.S.T.M. motor method octane number of this gasoline reached 80, and the C.F.R. research octane number 91, without the addition of tetraethyl lead.

Regenerated 3A catalysts† gave results approaching those of the fresh material, but gave slightly higher yields of gasoline with somewhat lower octane numbers.

Alternative cracking catalysts which have been investigated to date also tended to produce slightly higher yields of gasoline which had lower octane numbers than those resulting from the use of 3A. However, the field of preparing catalysts for petroleum cracking is in an active state of development. The results already attained show that the suspensoid process is sensitive to, and will profit by further improvements in catalyst activity.

As the octane-number requirements for motor gasoline increase, the problem of upgrading the light naphtha produced from most crudes becomes increasingly acute. In the case of suspensoid catalytic cracking, one solution is to include such light naphtha in the total feed to the operation. The results of cracking such a mix are given in Table 2 in which results at two different conversions are reported. In these operations the feed stock was composed of 15 per cent of light naphtha, 25 per cent of heavy naphtha, and 60 per cent of mixed gas oils, all from Mid-Continent-Louden stock. Since this feed represented the total stock available for motor gasoline production, the resulting distillate represented a refinery pool gasoline. As such, unleaded motor octane numbers around 80 and research octane numbers of 90 (including polymer gasoline) were notably high.

*The yield of C_3 and lighter products has been found to give satisfactory indication of cracking severity in the suspensoid process.

†Obtained from commercial "fluid cracking" units.

TABLE 2—SUSPENSOID CRACKING MID-CONTINENT-LOUDEN FEED STOCKS

Catalyst, fresh 3A 10 lb./bbl.; coil pressure, 600 psig.; feed rate, 9-10 V/V/Hr.*
Feed: A.P.I. gravity 40.7°, Naphtha content 40 L.V. %, Engler dist. 50% off at 518° F.

Approximate coil outlet temperature,† °F.	1,060	1,105
Yields excluding polymer gasoline—		
Gasoline, 10-lb., R.v.p., 400° F.B.P., vol. per cent	56.5	53
Heating oil (415°-600° boiling range), vol. per cent	16 (28° Gr.)	8 (20° Gr.)
Fuel oil (over 600° boiling range), vol. per cent	8.5 (7° Gr.)	9 (0.5° Gr.)
Excess butane‡, vol. per cent	5	8
Dry gas (propane and lighter), wt. per cent	16	24
Coke, wt. per cent	0.8	1.0
Gasoline octane numbers—		
A.S.T.M. motor method unleaded	75.0	78.3
A.S.T.M. motor method +3 cc. TEL	82.9	84.2
C.F.R. research method unleaded	86.3	90.0
C.F.R. research method +3 cc. TEL	93.7	96.4
Gasoline including polymer—10 lb. R.v.p.—		
Yield on fresh feed, vol. per cent	62.5	62.5
A.S.T.M. motor octane number unleaded	76.0	81.0
C.F.R. research octane number unleaded	87.0	91.0

*Volumes of liquid feed (at 60° F.) per volume of coil above 800° F. per hour. †Temperature of lead bath at the outlet section of the coil. ‡Excess over requirements to make a 10 lb. R.v.p. gasoline.

TABLE 3—SUSPENSOID CRACKING FEED STOCKS FROM VARIOUS CRUDES

(Feed rate 9 V/V/hour, coil pressure 600 psig.) Catalyst—Fresh 3A, 10 lb./bbl.

Crude source—	Mid-Continent Louden	Jusepin	Colombian	Lloyd-minister
Feed inspections—				
Gravity °A.P.I.	40.7	43.3	38.4	34.5
Naphtha content (400° Engler F.B.P.) L.V. %	40	49	35	27
Engler 50% point, °F.	509	439	464	484
Characterization factor	11.9	11.8	11.6	11.5
Conversion to dry gas—wt. % on feed	15	15	15	15
Yields—Excluding polymer gasoline—				
Gasoline, 10 lb. R.v.p., 400° F. B.P. L.V. %	56.5	63.0	57.4	56.1
Heating oil (415°-600° F. boiling range) L.V. %	19.0	13.6	20.2	18.2
Fuel oil (over 600° F. boiling range) L.V. %	8.5	5.0	5.3	6.6
Excess butane* L.V. %	5.0	5.6	4.7	7.5
Coke wt. %	0.8	1.0	0.8	1.1
Gasoline octane numbers—				
A.S.T.M. motor method unleaded	74.6	77.4	80.0	80.0
A.S.T.M. motor method +3 cc. TEL	83.0	84.2	85.7	84.0
C.F.R. research method unleaded	86 0	88.0	91.6	92.5
C.P.R. research method +3 cc. TEL	93.2	95.0	96.8	96.2
Gasoline including polymer—10 lb. R.v.p.				
Yield—LV % on feed	62.5	68.9	63.1	62.8
A.S.T.M. motor octane number unleaded	76.0	78.3	80.5	80.5
C.F.R. research octane number unleaded	87.0	90.6	91.8	92.7

*Excess over requirements to make a 10 lb. R.v.p. gasoline.

Effect of Feed Source

The greater part of the research conducted to date has been concerned with the suspensoid cracking of feed stocks derived from Mid-Continent-Louden crudes. A few runs have been carried out using feed stocks derived from other crudes. These indicate that, as would be expected, the nature of the crude has an appreciable effect on the yields and quality of the cracked products.

Table 3 illustrates the results of suspensoid cracking feed stocks from four different crudes, in order of decreasing paraffinicity, at a constant conversion of dry gas. Although the feed stocks varied widely in distillation characteristics, the octane numbers of the unleaded gasolines produced increased in order of decreasing paraffinicity as measured by the characterization factor. Leaded octane numbers showed a similar increase with the exception of the product from Lloydminster feed, which was higher in sulfur content than the other gasolines. Although the naphtha content of the feed obviously plays a large part in determining the yield of gasoline at a given conversion, other characteristics of the feed also have an important effect on all the product yields. Sufficient data are not yet available to allow general correlations to be made, so that the results of suspensoid cracking and unfamiliar feed can only be estimated in a very qualitative manner.

Place of Suspensoid Catalytic Cracking

The experience of the Imperial Oil, Ltd., in operating full-scale suspensoid catalytic cracking units over the last 6 or 7 years had established the fact that this is a low-cost operation, well suited to present-day requirements. The simplicity and flexibility of the process make it particularly attractive to the operators of smaller refineries. It has been the purpose of this paper to demonstrate that its potentialities are such as to enable it to meet any requirements which further developments in the automotive industry may make. The octane numbers of the gasolines produced from mixtures of all available feed stocks, and therefore representing refinery pool gasolines, invite comparison with other processes at present available to the industry.

References

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2. "Suspensoid," The Oil and Gas Journal, March 30, 1946.
3. "New Developments in Suspensoid Catalytic Cracking," C. F. Burk, The Oil and Gas Journal, October 12, 1946.

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DEEP DRILLING IN SOUTH TEXAS NECESSITATES CLOSE ATTENTION TO ADEQUATE FACILITIES FOR Handling Mud

by
Neil Williams

Mud-circulatory system on Meridith, Clegg, & Hunt steam rig at Flour Bluff showing dual shale-shaker installation at end of three steel circulating and conditioning tanks. Small tank on elevated mud-return ditch feeds chemicals into stream

ONE of the main problems of deep drilling in South Texas is the difficulty of maintaining adequate volumes of properly conditioned mud to insure effective control of the abnormally high gas pressures and salt-water flows usually encountered. When an exceptionally close balance of mud weight is required to prevent loss of circulation into formations of relatively low pressures, it frequently is impossible to avoid infiltration of gas and chlorides into the mud returns.

At times, contamination of the mud by gas cutting and salt-water dilution may be so great that in normal procedure additions of chemicals and other materials cannot be made fast enough to treat and condition the mud properly in the time allowed for recirculation to the hole. To keep from pumping light streaks around and thus creating the hazard of unbalancing further the mud column in the hole, it generally is desirable under such circumstances to bypass and discard returns and circulate freshly mixed mud. This, however, means loss of valuable chemicals and mud materials already used and adds substantially to new-mud requirements and costs of a well.

From a mechanical standpoint, solution of the problem is necessitating provision on deeper-drilling rigs of more adequate facilities for mixing, treating, and conditioning mud. In this, use of steel tanks, instead of earthen pits, is becoming more general as a means of reducing surface contamination of the mud, facilitating cleaning and removal of sedimentary accumulations, and eliminating losses due to seepage and other causes. Physical capacities of mud systems are being increased by employment of additional tanks or pits to make available not only a greater volume of conditioned mud for emergency demands but also a longer flow cycle to allow more time for mixing and treating and elimination of contaminating elements. With this greater flexibility in flow control is being obtained to meet varying circulatory requirements. Means of mixing are being expanded and improved to insure more effective and efficient utilizations of chemicals and additives and to obtain muds of more uniform characteristics. In this, ability to mix mud rapidly is a factor at times, particularly in cases of heavy loss of circulation or when large quantities of weighting material are having to be added to the system.

Three Skid-Mounted Tanks

Among the larger and more adequate mud systems now in use in South Texas is one provided by Meridith, Clegg, & Hunt, contractors on a deep test now being drilled for Humble Oil & Refining Co. in Flour Bluff field, near Corpus Christi, in Nueces County. This installation uses three skid-mounted, steel rectangular mud tanks (see accompanying pictures) in the regular circulatory system. These are placed side by side at right angles to the elevated mud-return ditch, which discharges either directly or through the shale shaker at the end of the mud ditch to a three-way flume mounted across the tops of the tanks. Through the three-way flume, mud returns can be directed to any or all of the three tanks as desired.

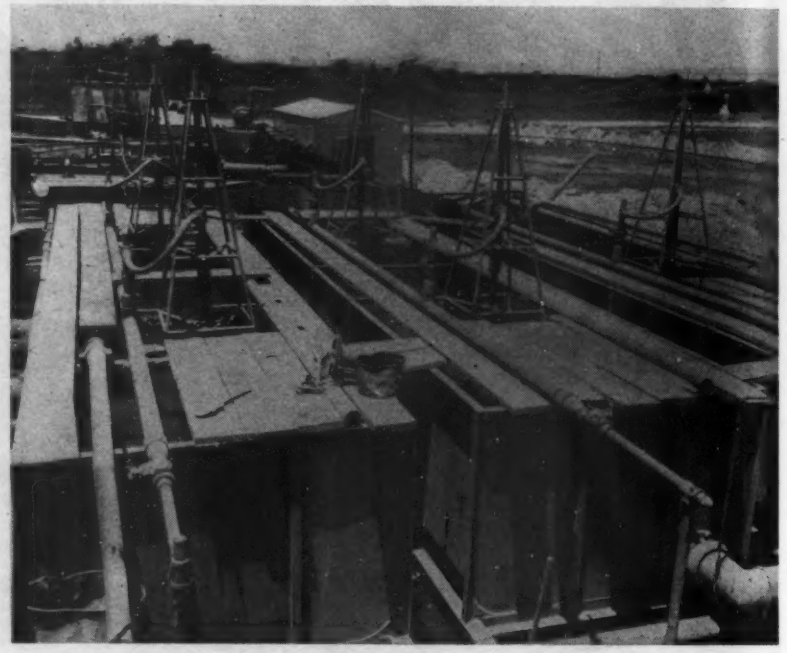
The tanks in turn are interconnected in such a way that they can be operated in various combinations

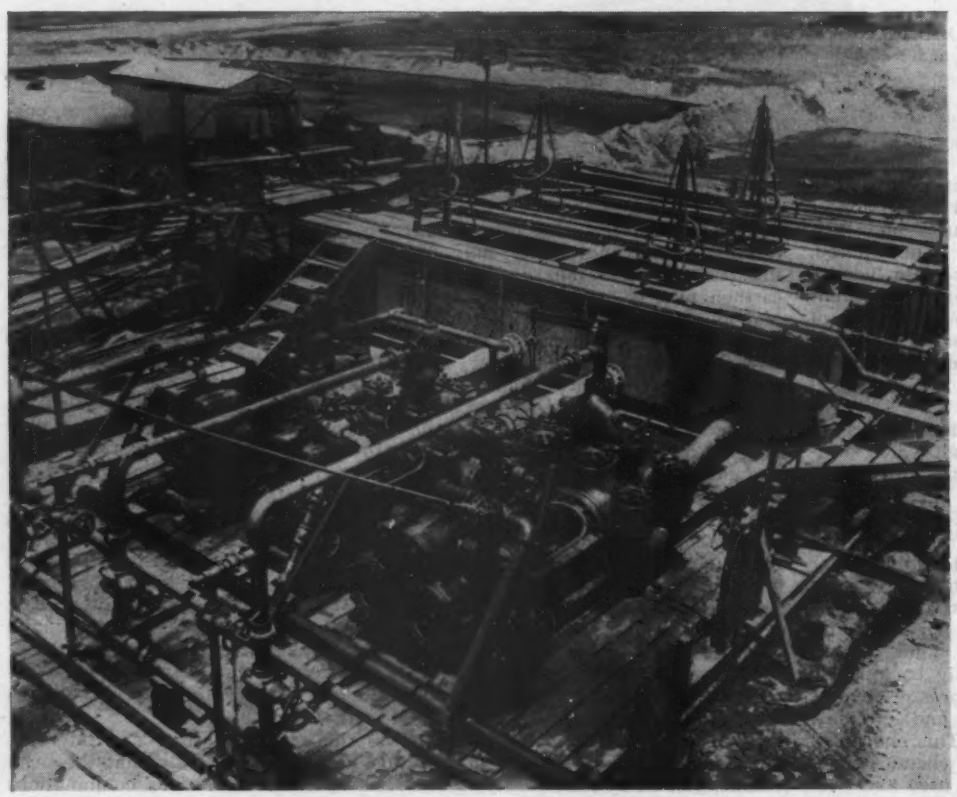
to permit a high degree of flexibility in flow control. For maximum flow cycle, all three may be operated in series by directing mud returns from the shaker or mud ditch first to the back tank, thence through this tank and out a bottom outlet line at the opposite end into the middle tank, thence through this tank and into the first tank to pump suction. Mud pumps are placed at the front side of the first tank and have suction lines extending through the first tank to the second, permitting use of either of these tanks for suction, and the other for receiving, if the back tank is not in use. Or, if it is desired to clean either the first or middle tank, the back tank may be used for receiving with one of the other two being available for suction.

Two Tanks Regularly Used

In normal operation, only two of the tanks are used in regular circulation. This leaves the third generally available for mixing fresh mud or conditioning any contaminated batch that might be bypassed from the system. Since use of the tanks can be rotated, the tank containing freshly conditioned mud can be opened quickly into the system while a batch of contaminated returns is being bypassed to one of the other receiving tanks. In this way it is possible to keep a continuous supply of properly conditioned mud immediately available at all times.

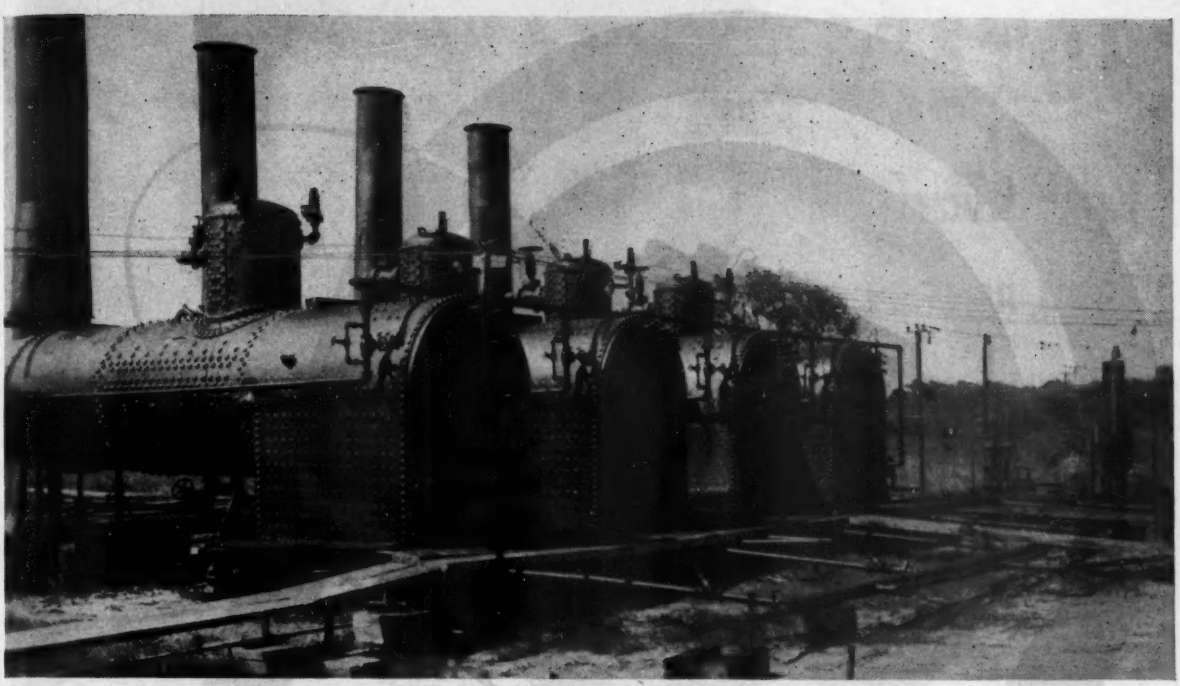
Tanks are equipped with submerged, rotating mud guns. Two each are installed on the first and middle tanks and one on the back tank. These are of a type which have been developed and introduced only comparatively recently. The gun consists of a cross-arm jet pipe submerged in the tank on the bottom of a 2-in. pipe, to which it is connected with a "T" union. The unit is suspended in a small derrick mounted over the tank or pit, and operates on mud pressure through a swivel connection on top the 2-in. pipe. The submerged cross arm contains four jets or beans, two on each side. These are set at





Above: Mud-circulating tanks equipped with submerged, rotating mud guns. Guns are suspended in small derricks on tops of tanks. Headers extending lengthwise across tops of tanks supply mud pressure for operation of guns. At far end is three-way flume for mud-return discharge from mud and ditch and shakers

Left: Mud pumps and circulating tanks as viewed from 14-ft. high derrick floor. Small pump at left is regularly used for operation of mixing guns and other auxiliary service but is connected into manifold of other pumps so that any or all can be used for any operation individually or in any combination, either in parallel or in compound. At extreme left is top of mud-logging and core-analysis truck kept continuously on location



Four 150-hp. 350-psi. working pressure boilers are needed to supply adequate steam for rig operation. Installation includes boiler feedwater preheater operated with pump exhaust steam and exhaust-steam-operated stack blowers

different angles to provide maximum agitation of mud in the pit as the arm rotates.

Mud pressure for operation of the guns is supplied normally from the discharge of a separate mixing pump with which the rig is provided. However, the discharges of the regular circulating mud pumps are tied into the system and can be used in the event the mixing pump is engaged for other operations or is shut down for repairs or other reasons. The main 3-in. mud line from the pumps extends in two directions, one side extending around one end of the tanks, and the second around the other. A 2-in. header is laid lengthwise across the top of each tank connecting with the main lines at both ends. From the 2-in. headers, hose connections, with individual valve cutoffs, are made to the respective guns. By this arrangement, the mud guns can be served from either or both directions, a precaution to insure continuous operation of the guns in event of a break in one of the main lines, and also to give more effective distribution of the pressure to guns when all are running.

By the continuous rotating jet action of the guns in the bottoms of the tanks, the mud is agitated constantly to prevent settling out of weighting and other mud materials and to facilitate release of any entrained gas. This also is a factor in maintaining a uniformly mixed mud, preventing channeling of mud returns to the pump suction, and, in turn, attaining effective and efficient utilization of weighting and other mud materials.

Two 20-in.-stroke duplex pumps are available at all times for circulatory requirements. These are manifolded together to permit operation of either pump singly, both in parallel for increased volume, or both in compound for greater pressure. In addition, the 16-in. duplex mixing pump also is tied into the manifolding to serve as a standby for either of the larger pumps or for use in compound with either or both of them in emergencies.

Increased Pump Capacities

High pressures and use of heavy muds in deep drilling are calling for provision of greatly increased pump capacities, including adequate reserve and auxiliary facilities to insure continuous operation under all conditions. Indicative of capacity requirements now being met, circulating pressures of from 1,200 to 1,400 psi. are becoming common. In some cases, it has been necessary to build up pressures at times as high as 1,700 to 1,800 psi. The latter high pressures may be needed particularly when attempting to turn the mud over after it has been allowed to stand and gel for a short time. Once the mud is started to move and drilling is resumed, lower circulating pressures usually will suffice.

Pump-pressure capacity requirements on the Flour Bluff rig have been reduced by the use of 5-in., instead of the usual 4½-in. drill pipe, which permits circulating greater mud volumes without corresponding increase in pressure loads.

The rig is steam powered and is provided with four 150-hp., 350-psi. working-pressure boilers, insuring adequate pressures for all current operating needs.

Maximum well protection against possible blowouts is afforded by a triple blowout preventer and drilling-control assembly, including a pressure-operated gate on bottom with two pressure-operated preventers on top. Height of the assembly necessitated elevation of the derrick floor with a 14-ft. substructure.

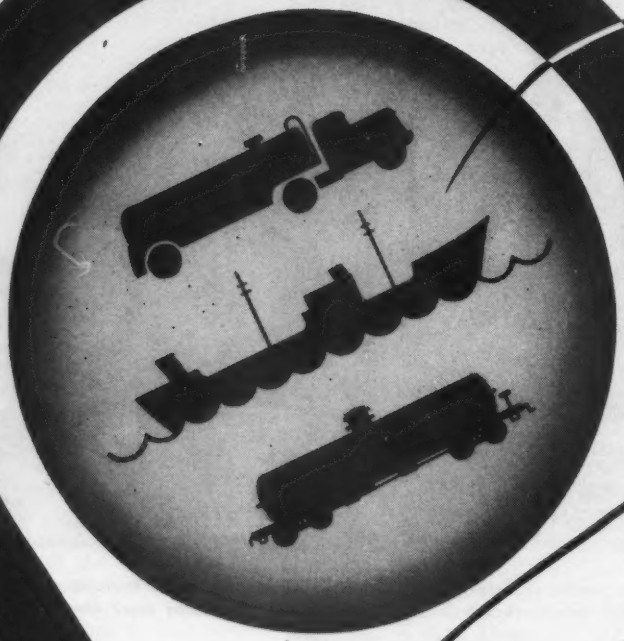
BOOKS

MEMORANDUM OF INFORMATION Published by American Petroleum Institute. 50 West 50th Street, New York.

This summary is developed under five different headings—demand, supply, problems, what the industry is doing, and what the public can do.

COMPRESSED AIR HANDBOOK. First Edition. Published by Compressed Air and Gas Institute, New York. 400 pp. $3 in U. S., $3.50 elsewhere.

This volume is published to meet the demands for a reference text on applications, installation, operation, and maintenance of compressing equipment and air-powered tools of all types. In addition to making available a mass of new and original data not heretofore published in a single volume, the handbook contains, in revised and improved form, all of the standard reference material formerly published as "Trade Standards." Included are definitions, test standards, and numerous basic tables and formulas.



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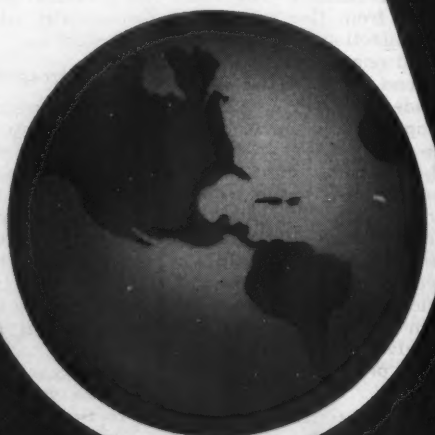

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WATER LOCATOR

Successfully Used In Permian Basin Workover Programs

by Leigh S. McCaslin

Service company personnel rigging up preparatory to running a water-locator survey

USE of electro-chemical apparatus to locate points of water entry in wells prior to recompletion and workover programs has gained wide acceptance in recent months in the Permian basin area of Texas. This method has been used successfully for some time in Pacific Coast fields but is relatively new in the Mid-Continent and Gulf Coast fields.

A summary of 24 surveys recently completed in Permian basin fields reveals that plugging of the water zone, indicated by the electro-chemical water locator, either shut off or materially reduced produced water on 17 of the 24 surveys attempted. Of the remaining seven surveys, the water entry could not be located in five; the water zone was located but plugging efforts were unsuccessful in one; and in the remaining well the water zone was located but plugging efforts were only partially successful.

In the five surveys where the water zone could not be located, the difficulty was not in the water-locator equipment, but in the conditioning of the hole prior to the survey. A detailed discussion of the conditioning difficulties encountered follows in later portions of this discussion.

Survey Fundamentals

The basic principle underlying the electro-chemical method for locating the source of water in wells is the reaction of a chemical solution on two dissimilar metals. These metals are contained in a small electrode tube that is lowered into the well on a single conductor cable. The chemical is introduced into the well and mixed intimately with the water in the well forming an electrolytic solution. This solution produces a voltage differential between the two metals in the electrode unit. This voltage is indicated at the surface by means of electrical instruments.

In any primary cell, the electromotive force will show a decided increase with the addition of a small amount of electrolyte until a maximum electromotive force has been reached after which the addition of electrolyte does not increase the electromotive force. The reversal of this process, as in the case of water from a formation entering a well containing an electrolyte, causes a slight decrease in electromotive force opposite the points where water is beginning to cause dilution. This phenomenon will continue until dilution of the electrolyte reaches a certain point, following which the drop in electromotive force will be very abrupt as illustrated in Fig. 1.

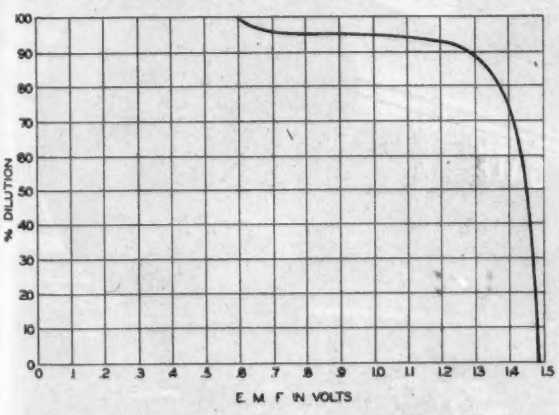

Fig. 1—This curve illustrates the effect of dilution of conditioned water on electromotive force. The E.M.F. is the voltage produced by water-locator electrodes in various mixtures of conditioned water and salt water

The electrolyte used to condition the water in the well prior to making a survey is one that will give a high electromotive force and one whose gravity will not increase the gravity of the conditioned water in the well sufficiently to cause gravitational diffusion with the incoming formation water.

The equipment used in electro-chemical water-location surveys is schematically illustrated in Fig. 2. It consists of three major items: (1) an electrode assembly; (2) an insulated electric cable and reeling mechanism for lowering and raising the electrode assembly in the well, and (3) an indicating meter which shows the nature of the fluid in which the electrodes are immersed.

The electrode used is 12-14 in. long and has a maximum diameter of 1¾ in. (See Fig. 3.) This small diameter is provided to enable it to be used in tubing. All wiring for the electrode is internal.

The reel for spooling the insulated cable is mounted on a truck chassis and is driven by the truck motor through a split-shaft power takeoff. The insulated copper conductors in the cable and the cable sheath are connected to slip rings mounted at one end of the reel. This permits electrical readings to be taken while the cable is in motion. No generator or other external source of power is required in the electrical circuit as the current required for operation of the indicating meter is furnished by

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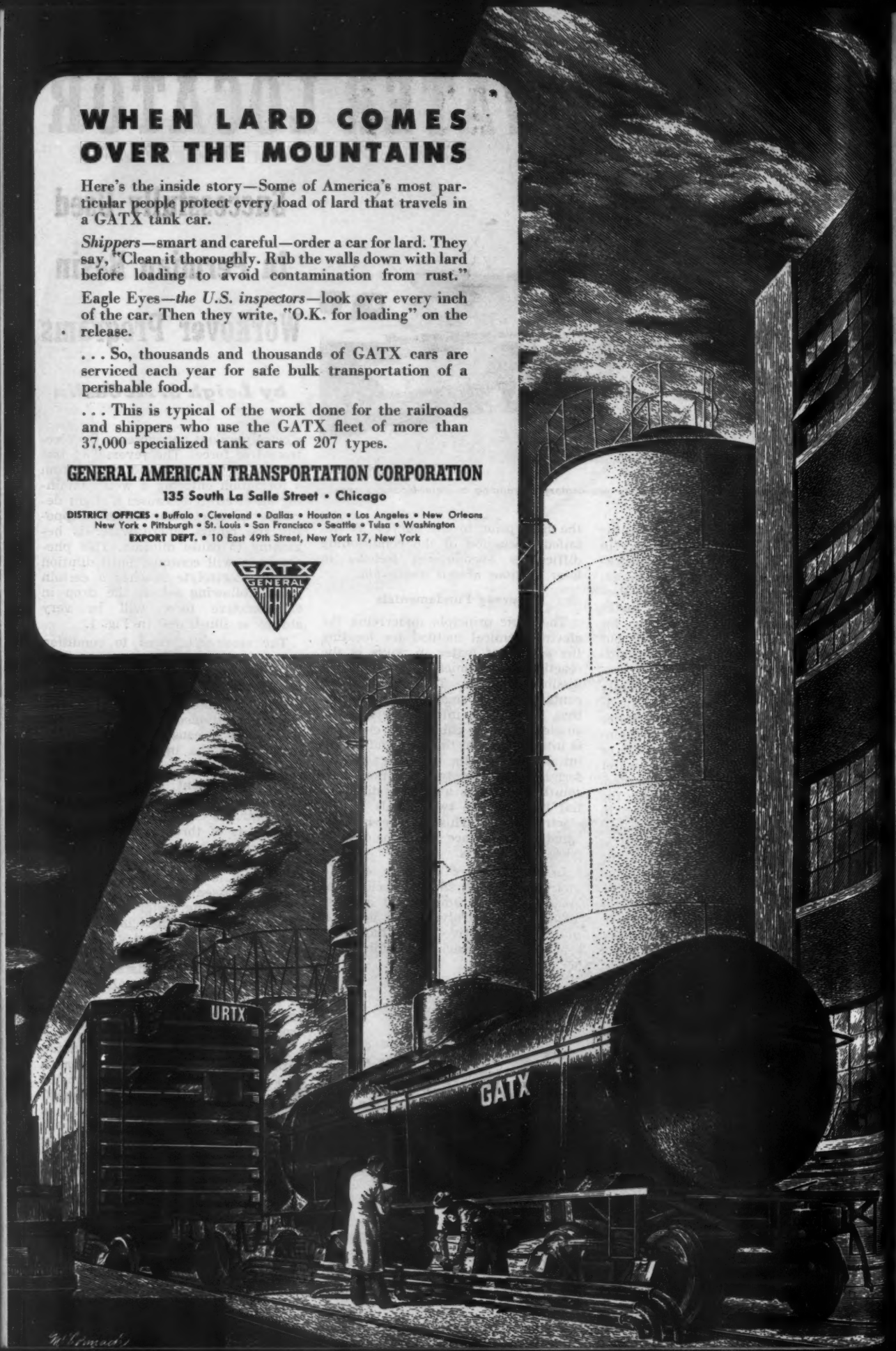


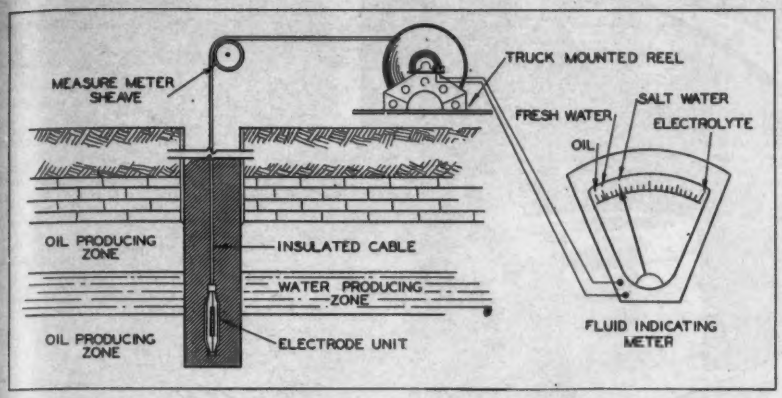


Fig. 2—(Left) Electrochemical water-locating equipment

Fig. 3—(Right) A photograph of the electrode used in water-locator surveys. It is 12-14 in. long and has a maximum diameter of 1¾ in.

the battery action of the electrodes in the well.

An electrical meter which is very sensitive to small changes in current flow is used to indicate the type of fluid in which the electrodes are immersed.

Survey Procedure

Three separate operations, as follows, are involved in the running of a water-locator survey: (1) preliminary conditioning, (2) introduction of the electrolyte into the well, and (3) the actual survey.

Preliminary conditioning does not interfere with the well's production unless the well has to be cleaned out or the tubing pulled to remove a plug on the bottom. A clean well free of cavings and other material that might interfere with the operation of the equipment is an important prerequisite. The tubing must have an open end in order to conduct the survey; hence the need for removing the bottom plug. If a well has been killed with water, or water has set on the formation over a long period of time, the well must be produced and then allowed to come to a static pressure condition before the survey.

The next operation involves the **introduction of the electrolyte** into the well. The fluid electrolyte or conditioning agent is distributed throughout the water in the well by means of a special bailer. In the case of a pumping well, the bailer containing the conditioning chemical is run down the open-end tubing after the rods have been pulled. On flowing wells, a special combined bailer-electrode unit must be lubricated into the tubing. This combination bailer electrode enables the survey to be run immediately after the electrolyte has been dumped. This is necessary in flowing wells as the electrolyte would become too highly diluted or be washed away altogether if time was consumed pulling the bailer to the surface before running the electrode.

The **actual survey** to determine where the water enters the well is done after a test run is made with the electrode to verify proper conditioning of the fluid in the well.

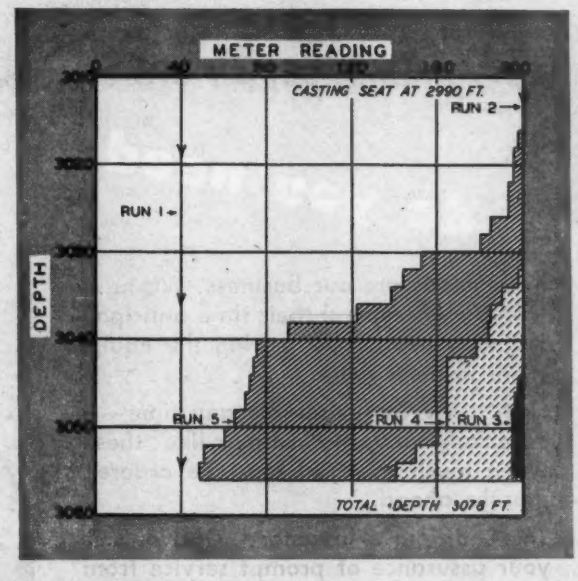


Fig. 4—Actual graph of a survey made on a 3,078-ft. well in Jal pool, Lea County, New Mexico

When this has been done the well is produced a definite period of time either by flowing, swabbing, or bailing to permit fluid from the formation to enter the well. Following each production period a traverse of the selected part of the well is made with the electrode to determine the exact points where dilution of the electrolyte is being caused by the entrance of water into the well.

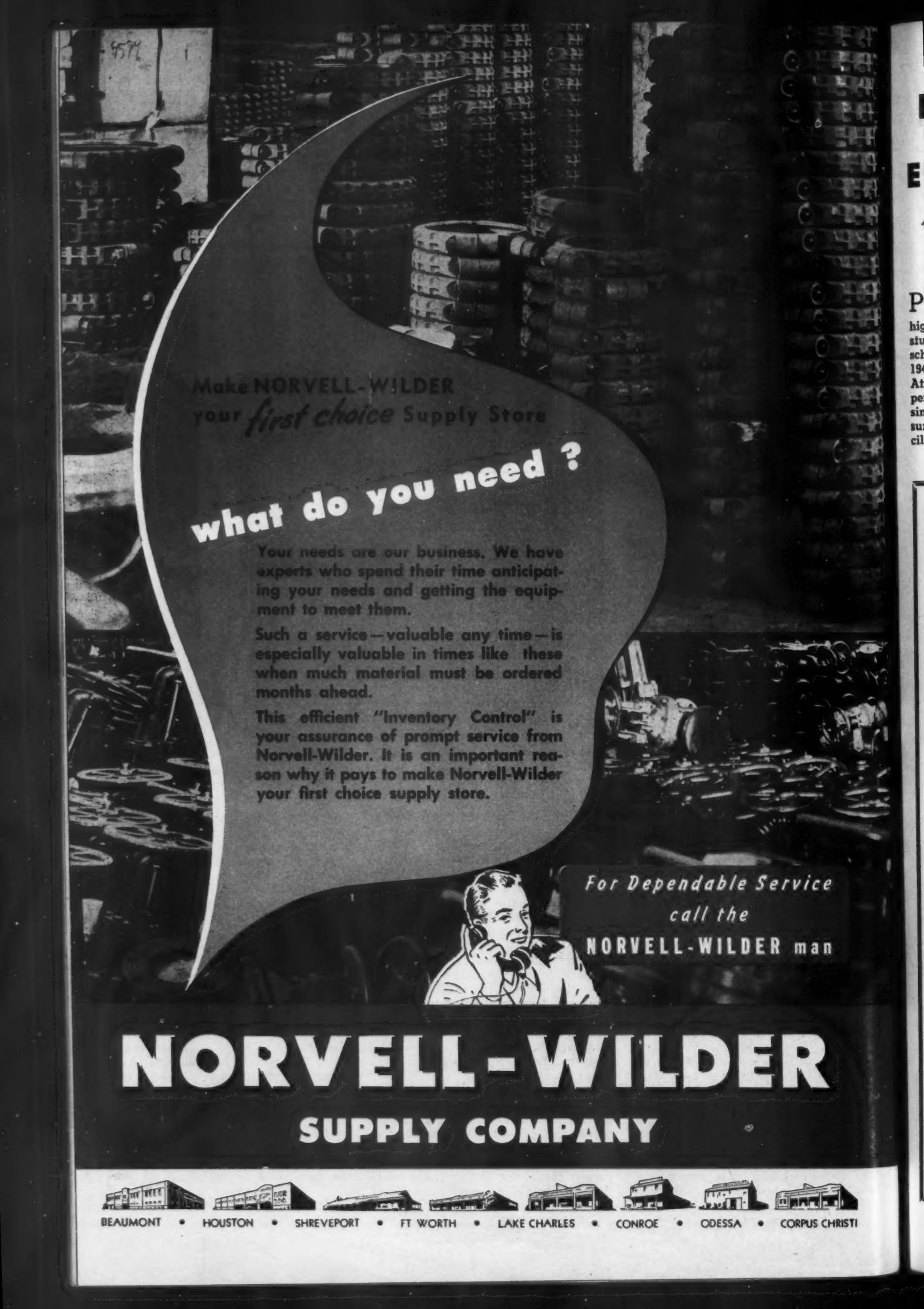
The number of traverses made may vary due to rate at which well is produced between traverses and the rate at which water enters the hole. Usually several traverses are required to secure the necessary data on the location of the zones producing the water.

A special technique has been developed, and used in the field to some extent, which permits running the bailer electrode down the annulus between the casing and tubing of a well. A special casing head is used to permit the entry of the bailer electrode allowing the well to continue producing during most of the survey. Hence, major advantage of this special technique is the elimination of a large percentage of down time on the well. In addition, the rate of fluid production can be made even and continuous which makes for a better survey.

Permian Basin Surveys

The 24 recent surveys in the Permian basin are of considerable interest for several reasons. In the first place, the sources of water intrusion were of a wide variety, as follows: bottom of hole, casing seat, intermediate or upper entry, dual entry, and water throughout the open hole. Also, a number of different plugging materials were used following the survey. Among these materials were plastic, cement, steel liner and cement, and packer. The conditions existing in each well and the considerable success obtained by the plugging from the standpoint of increased oil pro-

(Continued on page 95)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UNIVERSITY OF TEXAS

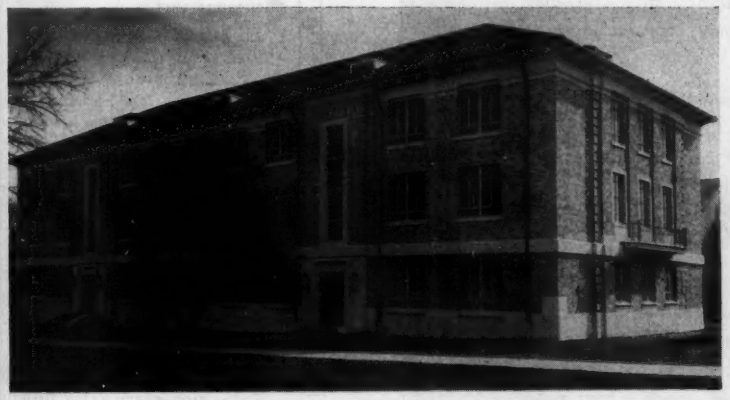
PETROLEUM engineering schools reached an all-time enrollment high this past school year with 3,928 students in the 17 U. S. petroleum schools. This compares with 2,877 for 1940-41, the last prewar school year. At the same time, the demand for petroleum engineers has reached a similar peak. A survey made last summer by the Engineers Joint Council, covering 104 concerns which employ 40,000 engineers, showed that there will be an average annual increase, in the next 4-year period, of about 8 per cent in the number of engineers employed.

H. H. POWER

G. H. FANCHER

This situation has created much discussion in the industry. Questions have been numerous—Can the petroleum engineering schools fill the need? What is the caliber of the petroleum engineering teaching staffs? What laboratory facilities are available in the nation's schools? What starting salary can the young engineer expect? Are scholarships and fellowships available for bright young men interested in the oil industry?

The accompanying article is the first in a series, on leading petroleum engineering schools, which will answer these questions.



Three-story petroleum engineering building of University of Texas. The structure is 175 ft. long and has a gross floor space of 33,000 sq. ft.

SALIENT FACTS AND FIGURES

General.—Organized by an act of the legislature in 1881. Coeducational, state controlled. Main university at Austin, medical branch at Galveston, college of mines and metallurgy at El Paso. Administered by board of nine regents. Texas Memorial Museum located on main campus. University has one-quarter interest in W. J. McDonald Astronomical Observatory located on Mount Locke, near Fort Davis, Tex.

Calendar.—School operates on semester system. The 1947-48 calendar consists of a summer-fall semester (summer and fall terms), winter semester, spring semester, and a June term.

Fees.—Tuition for Texas residents is $50 per year. Nonresidents pay the same that Texas residents are charged in their states with a minimum of $50 per year set.

Finances.—University owns 2,000,000 acres of land in West Texas given by the state for a permanent university fund. Oil was discovered on this land in 1923 and royalties and bonuses now accrue to this fund. The fund is expendable for permanent improvements, salaries, and maintenance. Since 1931 a portion of the fund has been given to Texas A. & M. College.

Buildings and grounds.—Main campus consists of 221 acres; however, 475 total acres are available in Austin. Radio studio is operated on the campus to broadcast programs originating on campus. The main library and branches house 730,000 volumes.

THE department of petroleum engineering of University of Texas, which was founded in 1930, is distinguished by two things: (1) It is located in the largest oil-producing state in the United States, and (2) it built the first all petroleum-engineering building in the country.

Dr. H. H. Power, formerly chief production engineer of Gulf Oil Corp., Tulsa, is professor and chairman of the department. Dr. G. H. Fancher, who taught previously at Colorado School of Mines and Pennsylvania State College, was appointed professor in 1935. Dr. Charles F. Wienaug and A. E. Sweeney, M.S., are other members of the present faculty. Experience of these men in the oil industry and in college teaching is 27, 20, 5 and 10 years, respectively. W. R. Woolrich is the dean of engineering.

Since 1930, the school has grown to an enrollment of 506 students for the 1946-47 school year. This compares with 319 students for 1940-41, the last prewar year, and 380 students for 1945-46. The breakdown by classes for this past school year was as follows: freshman, 217; sophomore, 151; junior, 89; senior, 49; fifth year, 5; and graduate, 47. In the 3 years immediately preceding the war—1939, 1940, and 1941—65 diplomas were awarded annually.

University of Texas has fellowships from Stanolind Oil & Gas Co., Shell Oil Co., Inc., and Ethyl Corp. at the present time. In recent years, the school has turned out five or six master's programs each year. These

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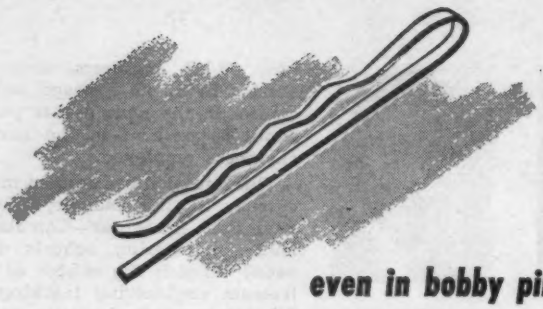

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Across the 5 & 10 counter, steel bobby pins cost only a dime for 30 — cheap, aren't they, considering the service they perform?

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This illustrates in a striking manner the small amount which the cost of steel plays in the ultimate cost of steel products. Any increases that have occurred in the price received by the steel producers are not important from an inflationary standpoint. ***Steel IS cheap.***

The average price of steel as obtained by the mills is a little over 3c per pound — about $60 per ton (based on weighted production of 9 major steel mill items, representing a substantial percentage of steel production in the United States.) Including the recently announced increases, steel has advanced only about ½c per pound over the last ten years.

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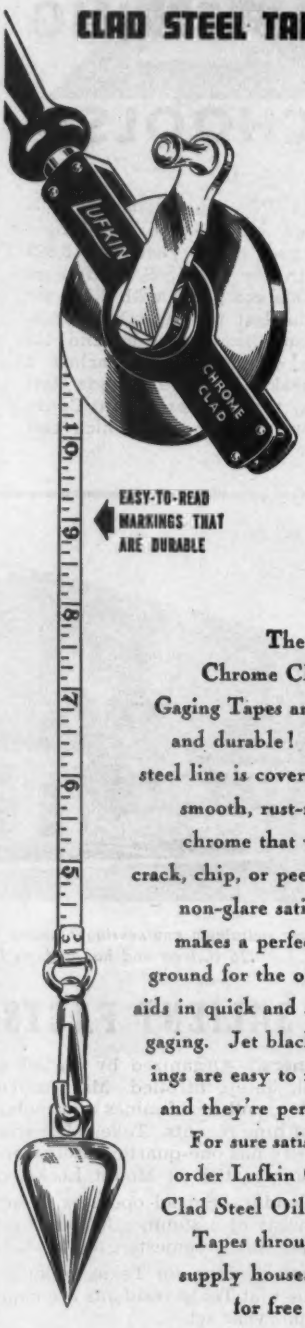

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programs have been concerned mostly with research on reservoir problems, thermodynamics (PVT) research, secondary recovery, heaving shale, bacterial research (hydrocarbon deterioration), and drilling fluids.

Doctorate programs are arranged to suit individual requirements with the special approval of the graduate faculty. An average of one program per year is completed.

Facilities are available for graduate as well as for undergraduate work. A core laboratory was installed in 1937 so that research could be conducted on the physical properties of cores from oil and gas wells. Core analysis, as well as other special subjects, such as mud testing and preparation, oil-well-cement testing and preparation, and studies of flow of fluids through sands are emphasized in undergraduate laboratory work.

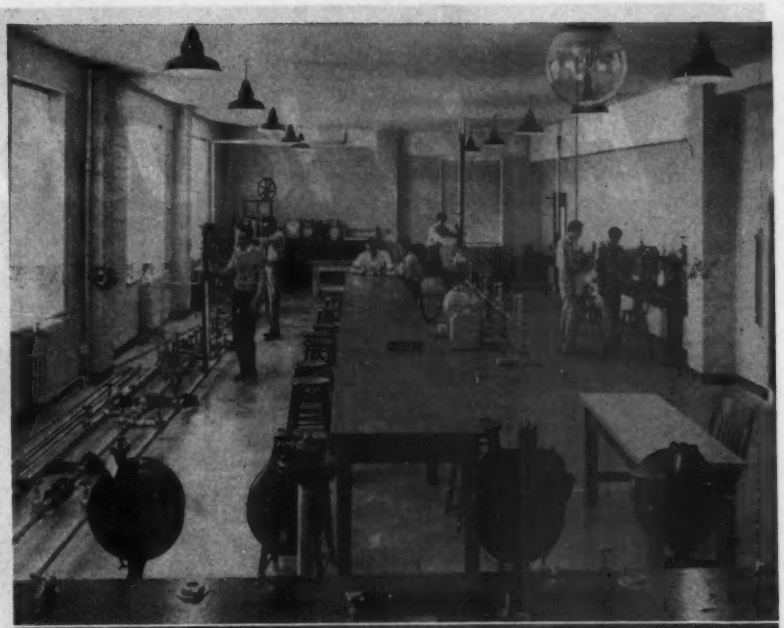
The 1947 graduate of University of Texas with a B.S. degree in petroleum engineering received an estimated average starting salary of $250, as compared with $175-$200 for 1941.

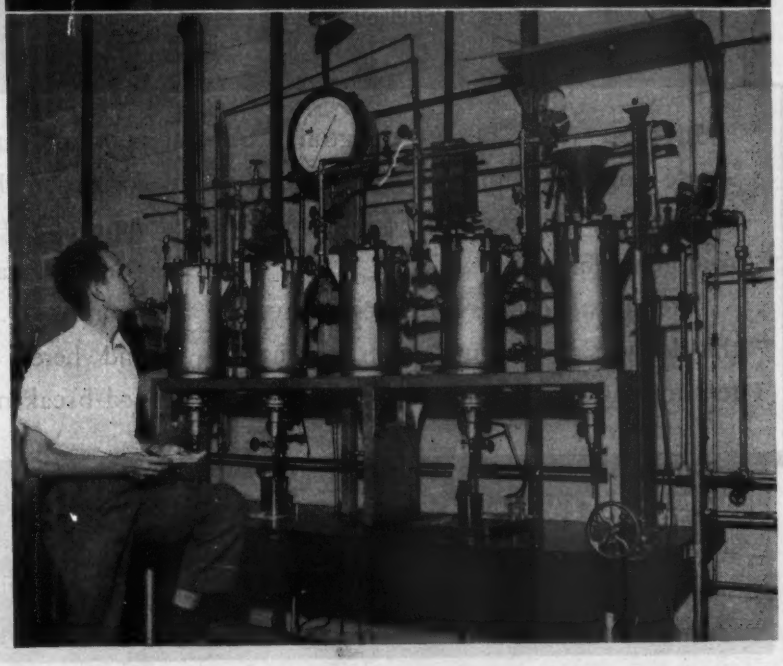
Details of Courses

Specialized undergraduate courses offered include (figures in parenthesis are credit hours): **Petroleum Engineering Problems** (3), introduction to chemical and thermodynamic calculations; **Production Methods** (3), general descriptive course covering drilling and production practices; **Reservoir Engineering** (3), introduction to reservoir engineering; **Petroleum Engineering Laboratory** (3), core analyses, tests on drilling muds, and general testing procedures; **Petroleum Production Engineering** (6), engineering approach to production practice; **Natural Gas Engineering** (4 or 3), measurement, regulation, and transportation of natural gas; **Petroleum Design**, design of physical equipment and plants in production practice; **Petroleum Valuation and Economics** (3), oil and gas reserves, economics, and natural gas properties.

Graduate courses on the curriculum are: **Graduate Seminar** (6), **Secondary Recovery** (3), **Pressure Maintenance** (3), **Phase Relationships of Oil and Gas Mixtures** (3), **Reservoir Engineering** (6 to 12), **Advanced Petroleum Engineering Laboratory** (6), **research and thesis for M. Sc. degree and research and dissertation for Ph.D.**

Courses have been organized and conducted by the petroleum engineering department in graduate centers such as Houston, Dallas, and Fort Worth, to enable the engineer on the job to continue his education.





Top: Students at work in gas testing and metering laboratory. Center: Dr. Power, chairman of petroleum engineering department, in oil-testing laboratory. Bottom: Student recording test results on battery of fluid-flow and oil-recovery test units

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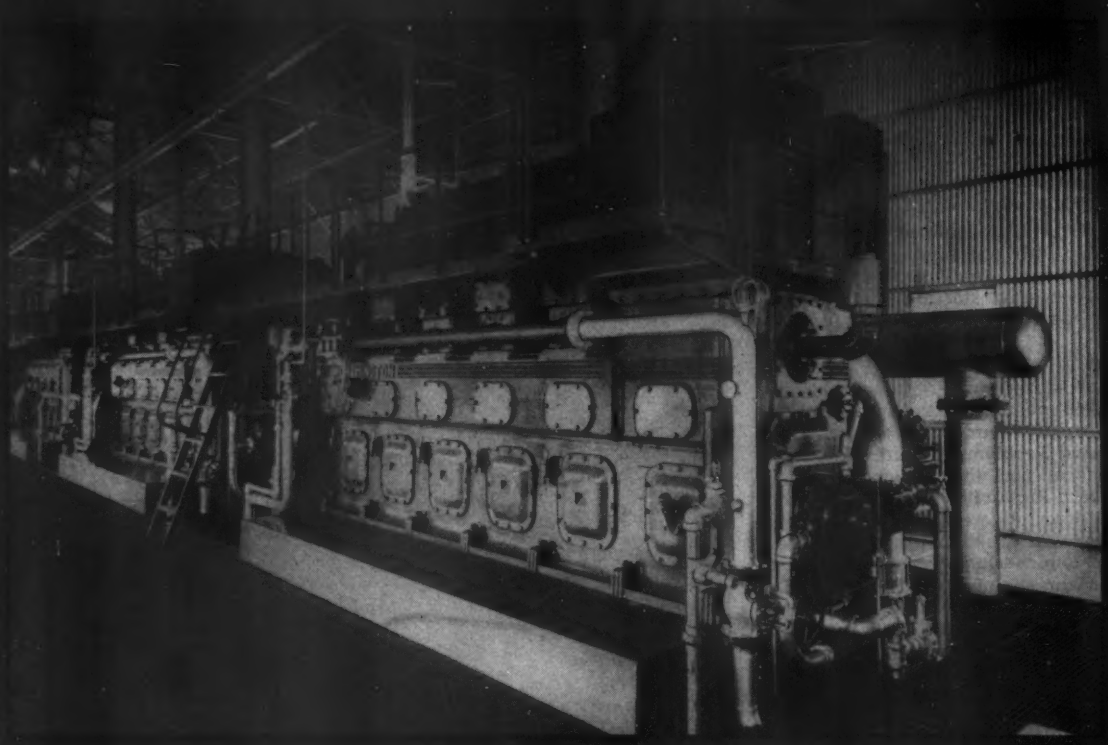

A Battery of Worthington Angle Gas Engine Compressors — Type LTC, 600 hp — In A Big Southwestern Gas Plant

In these views of Worthington LTC Angle Engine Compressors, note the size and number of covers on both main and compressor frames.

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QUESTIONS on TECHNOLOGY

by W. L. Nelson

Consulting Engineer

Cost of Catalytic Cracking

What is the cost of catalytic cracking and the cost of installations?—F. C. E.

The cost of installation has been high and the recent high costs of labor and construction have made it difficult for the designers and builders of these processes to state costs. When more small plants are in operation, the costs can be stated with more authority. The proper and best place to get information is to write contractors to make quotations for the particular plant situation.

Prior to World War II the costs of topping, thermal and Houdry cracking were somewhat as follows (Ref. 11):

Dly. cap., bbl.	Thermal	Houdry	Topping
1,000-5,000	$70-$110	.....	$35-$60
8,000-16,000	$50-$65	$195-$365	$12-$30

During the war, the early Fluid and T.C.C. plants ranged in cost up to about $600 per daily barrel, and a few plants cost even $1,500.

The literature since 1945 with respect to cost is summarized in Table 1. Miscellaneous costs of topping, polymerization, etc., are also included because they are all somewhat related to catalytic plants. The Bland[5] reference reports the installation cost of the recent T.C.C. unit at Leonard Refineries, Inc. This revamp job involved converting an existing 1,800-bbl.-per-day Dubbs two-coil cracking unit into a 3,000-bbl.-per-day T.C.C. unit. Additions consisted primarily of the T.C.C. reactor-regenerator system, a small No. 2 distillate stripper, a low-pressure gas separator, gas compressor with a cooler, and a propane receiver for the stabilizer, all for $200-$250 per daily barrel.

A breakdown on operating costs is available from the Noll, Bergstrom and Holdom[6] article on 5,000-bbl.-per-day T.C.C. units, one emphasizing vis-

TABLE 1—SUMMARY OF CATALYTIC CONSTRUCTION AND OPERATING COSTS

	Capacity (bbl. per day)	Construction ($ per dly. bbl.)	Operation (cents/bbl.)	Reference
Topping	10,000 crude	35	4.2	7 (1945)
Topping	5,000 crude	...	8.0	9 (1946)
Vacuum flash	3,500 reduced crude	43	...	3 (1947)
Vacuum flash	2,400 reduced crude	...	8.0	9 (1946)
Vacuum distillation	3,000 reduced crude	100	5-7	1 (1947)
Vacuum distillation	750 reduced crude	167	...	6 (1946)
Propane deasphaltizing	3,000 reduced crude	130	10-14	1 (1947)
Delayed coking (feedstock preparation)	3,000 reduced crude	300	20-25	1 (1947)
Desulfurization (Perco catalytic)	——	...	6.5-7	4 (1947)
Polymerization catalytic	54 poly	...	*162	10 (1945)
Polymerization catalytic	72 poly	...	*137	10 (1945)
Polymerization catalytic	92 poly	163	...	6 (1946)
Polymerization catalytic	106 poly	151	*123	7 (1945)
Polymerization catalytic	110 poly	...	141	9 (1946)
Polymerization catalytic	162 poly	...	*97	10 (1945)
Polymerization catalytic	170-180 poly	117-118	*87	6 & 7 (1945-46)
Polymerization catalytic	217 poly	...	*88	10 (1945)
Polymerization catalytic	270 poly	...	*86	10 (1945)
Polymerization catalytic	362 poly	...	*80	10 (1945)
Caustic wash	1,121 gasoline	...	2	9 (1946)
Refinery administration and overhead	5,000 crude	...	7	9 (1946)
Gas plant (T.C.C.)	3,650 gas oil	129	5.8	7 (1945)
Gas plant (T.C.C.)	†3,650 gas oil	142	6.1	7 (1945)
Gas plant (T.C.C.)	†4,750 gas oil	132	5.2	7 (1945)
Reforming (thermal)	1,120 naphtha	72	...	2 (1947)
Reforming (isoforming and some polymerization)	1,642 naphtha	226	...	2 (1947)
Reforming (Perco cycloversion)	——	...	10-15	4 (1947)
Thermal cracking	3,500 reduced crude	247	...	3 (1947)
Thermal cracking including gas plant	6,100 reduced crude	177	12.3	7 (1945)
Thermal cracking including gas plant	4,500 reduced crude	...	13.0	7 (1945)
Thermal cracking and topping and some polymerization	5,000 crude	...	35.4	6 (1946)
Thermal reforming, isoforming and some polymerization	3,690 gas oil	163	...	2 (1947)
Thermal cracking	1,722 gasoline	500	...	3 (1947)
Thermal, complete from crude	10,000 crude	140-174	...	7 (1945)
Fluid cracking	2,255 gas oil	...	31	9 (1946)
Fluid cracking	900 gas oil	...	41-44	10 (1945)
Fluid cracking	2,700 gas oil	...	26.3-29.8	10 (1945)
Fluid cracking	2,870 gas oil	380	...	3 (1947)
Fluid cracking	4,500 gas oil	...	23.8-25.5	10 (1945)
Fluid cracking and vacuum flash	3,500 reduced crude	343	...	2 (1947)
Fluid cracking and vacuum flash	2,870 gas oil	418	...	2 (1947)
Fluid cracking and vacuum flash	1,722 gasoline	700	...	2 (1947)
T.C.C. revamp of 1,800 bbl. per day thermal unit	3,000 gas oil	200-250	...	5 (1947)
T.C.C. revamp	2,412 gas oil	322	...	6 (1946)
T.C.C. revamp	3,650 gas oil	322	14.8	7 (1945)
T.C.C. revamp	†3,650 gas oil	355	19.5	7 (1945)
T.C.C. revamp	†4,750 gas oil	336	18.2	7 (1945)
T.C.C., mild reforming, poly, and vis-breaking	5,000 crude	...	40.1	6 (1946)
T.C.C., mild reforming, poly, and vacuum flash	5,000 crude	...	40.7	6 (1946)
T.C.C., miscellaneous on crude	10,000 crude	251-295	25.6-31.4	7 (1945)
Fluid cracking, complete from crude	5,000 crude	...	35.7	9 (1946)
Fluid cracking, complete from crude	4,500 crude	...	46.5-53.0	8 (1947)

*Not including royalty of about 20 cents per barrel. †At 1:1 recycle.

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TABLE 2—APPROXIMATE OPERATING COSTS OF 5,000-BBL.-PER-DAY COMBINATION T.C.C. UNITS AND A THERMAL CRACKING UNIT

	Cents per bbl. crude			Percentage		
	Thermal	T.C.C. (vis. br.)	T.C.C. (vacuum)	Thermal	T.C.C. (vis. br.)	T.C.C. (vacuum)
Crude distillation	6.0	6.0	6.0	16.9	15.0	14.8
Vacuum reduction	...	...	1.8	...	...	4.3
T.C.C. cracking	...	13.4	12.2	...	33.5	30.1
Thermal reforming	3.4	2.9	2.9	9.6	7.2	7.1
Thermal cracking	8.0	...	...	22.7	...	...
Debutanization	0.3	0.4	0.4	0.8	1.0	1.0
Catalytic polymerization	2.3	3.1	3.1	6.5	7.7	7.6
Gasoline inhibitor	0.1	0.1	0.1	0.3	0.2	0.2
Taxes, interest, insurance (incremental)	0.4	2.7	3.1	1.1	6.7	7.6
Royalty—T.C.C.	...	2.4	2.5	...	6.0	6.1
Thermal	1.7	...	...	4.8	...	...
Poly	0.4	0.7	0.7	1.1	1.7	1.7
TEL to 79 C.F.R.-M.	12.8	8.4	7.9	36.2	21.0	19.5
Total	35.4	40.1	40.7	100.0	100.0	100.0

cosity breaking and the other vacuum flashing, as shown in Table 2.

Royalties for various operations are:

Thermal cracking, cents per bbl.	3.0
Catalytic polymerization, cents per gal.	0.5
T.C.C. and Fluid, cents per bbl.	5.0

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Guard With Goggles

by Henry W. Boggess*

IN American industry there are approximately 100 workmen who lose the sight of both eyes, more than 1,000 who lose the sight of one eye each year, and about 2,500 idle each working day in the year due to accidental eye injuries.

Considered in light of the fact that there is adequate scientific eye protection available to prevent 99 per cent of such injuries, it seems that the losses enumerated above are very dear prices to pay for apathy or lack of information, or both.

Eye injuries are most prevalent in such jobs as chipping, caulking, grinding, lathe work, use of power tools, machines in shop work, both wood and metal, sand blasting, babbitting, pouring of hot metals, handling acid and caustics, welding (requiring ultraviolet and heat ray protection), heat cutting of metals, furnaces, foundry cupolas, electric arcs, and many others.

*Superintendent Employment-Insurance-Safety, Sinclair Prairie Oil Co.

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Like vigilance prevails throughout our plant: In engineering, forging, machining, etc. Every forging must be RIGHT . . . Its uniformity is electrically controlled; automatically shutting off at a point for proven CORRECT forging . . . No "burning" possible.

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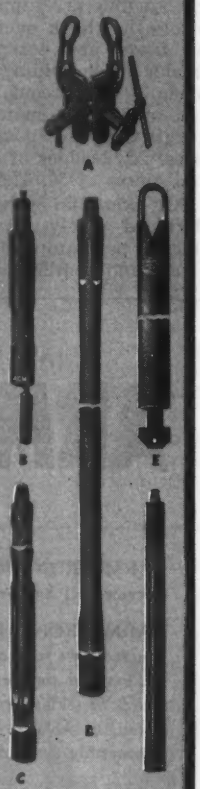
* * *

For more information, see our 24-page Catalog in Composite Catalog (Vol. 1). Or tell us your needs, by TODAY'S mail.

Fig. 107 Acme Rein Type Drilling Jar



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The petroleum industry engages in many of these activities and in larger companies having accident-prevention departments, eye protection is routine procedure.

Generally, there are two types of industrial goggles, in addition to eye shields and helmets. These two types are:

1. Cup
2. Spectacle

Cup-type goggles consist of two cups of light, heat-resistant material, anatomically shaped to fit around eye-socket contours and connected by a flexible and adjustable bridge and supported by a head band. There are variations of cup designs to protect against various hazards such as grinding and chipping, dusts, chemicals, and welding types that are spark and light proof.

Spectacle-type goggles look much the same as ordinary reading glasses in that they are supported by temple pieces that hook over the ears. Some of these are equipped with side shields (both folding and stationary) made with screens, leather, lucite, and other such materials. This type goggle may be bought in different sizes, i.e., bridges of different lengths and lenses of 50, 47.5 and 45 mm.

All industrial goggles except those designed solely for ray protection should be equipped with standard clear and hardened safety lenses. When required, these hardened lenses can be ground to correct any loss of visual acuity; they can be secured with flat lens surface or with varying degrees of curvature to suit conditions. Specifications for the hardening of lenses to insure maximum impact resistance should conform to federal standards as set by the Material Laboratory, U. S. Navy Yard, test of a hardened safety lense is ⅝-in. ball weighing 2/3 oz. dropped from a height of 39 in. on the outer surface of the lens without chipping or cracking. Most manufacturers furnish lenses that will withstand the impact of a 1-in. ball weighing 2½ oz. dropped a distance of 120 in. In addition to impact resistance, safety lenses must be single solid plate glass suitable for optical purposes and must be free from visual defects, surface polished and ground.

Even lenses used primarily to filter harmful rays, such as ultraviolet and infrared, may be obtained of hardened lenses. Exceptions to the standard use of hardened lenses are the rubber chemist goggle and certain other types to be used solely for ray protection when there is little, if any, likelihood of impact hazard.

There is hardly a job in oil-field production work where eye protection is not needed, at least occasionally. It is standard practice for employers to furnish proper eye protection and to enforce the rule that all employes in operations indicating the possibility of eye injury must use such protection.

Annual Weights, Measures Conference Is Scheduled

A symposium on vehicle tanks will highlight for petroleum industry representatives the program of the thirty-third National Conference on Weights and Measures, to be held in Washington September 22-25.

Papers to be presented at the conference include: "The Distribution of Liquefied Petroleum Gases," L. L. Kennedy, Standard Oil Co. of New Jersey; "Large-Capacity Meter Installations," H. G. Smith, Smith Meter Co.; "Regulating Domestic Sales of Fuel Oil," J. A. Boyle, Department of Weights and Measures.

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Mass Spectrometer

(Continued from page 65)

and each pattern is different from that of any other gas.

Think of each molecule as a block, in which there are certain natural groves or joints, along which it will always split when hit by an electron bullet. But each different kind of gas molecule (or block) has its own distinctive pattern of grooves or joints, along which it will split, and no two split exactly alike.

Nature appears to have a system of finger-printing the different kinds of gas molecules, but with this difference. All methane molecules have the same fingerprints, even though they differ from those of ethane or any other gas. It is as though all Smiths had the same kind of fingerprints, and all the Browns had fingerprints alike, but that Smith fingerprints were decidedly different from Brown prints.

The mass spectrometer simply takes a small volume of mixed gases, fires electron bullets at the separate molecules, breaks them up along their natural lines of weakness, collects the pieces, sorts them by weight (mass), and counts the number of pieces of each particular weight.

From this information, plus the known patterns of pure, unmixed molecules, by simple algebra it is possible to tell exactly what percentage of each kind of gas molecules was present in the original sample. This is possible even in complicated mixtures of as many as 20 different kinds of hydrocarbons and inorganic gases.

One of the things that makes it particularly useful to the petroleum industry is the fact that such closely related hydrocarbons as normal butane, isobutane, and butene, or normal pentane and isopentane, can be distinguished readily from each other, and each one measured separately just as easily as any other molecules. The grooves or joints along which the splits take place are always different in two different kinds of molecules. This is true, no matter how closely the molecules may be related to each other, and how many properties are very similar, as long as they are really different kinds of molecules.

The mass spectrometer, due to its size and the complexity of its electronic circuits, has sometimes been called a "Rube Goldberg pea splitter," and the analogy isn't too far off. But it works and makes plenty of dollars and sense in the petroleum industry.

TABLE 1—PARTIAL MASS SPECTRA—ARBITRARY DIVISIONS PER MICRON PARTIAL PRESSURE

Mass	Methane	Ethane	Propane	n-Butane	Isobutane	n-Pentane	Isopentane
15	10.50	0.92	1.30	1.30	2.10	0.82	1.20
16	12.65	0.02	0.02	0.02	0.07	0.10	0.02
26	....	4.89	1.51	1.06	0.46	0.56	0.41
27	....	7.44	7.99	8.97	7.60	9.10	6.86
28	....	23.92	12.20	8.29	0.90	1.64	1.05
29	....	5.06	20.69	11.17	2.00	7.62	8.29
30	....	5.82	0.45	0.26	0.04	0.16	0.18
39	....	....	3.61	3.45	5.13	3.87	3.87
40	....	....	0.56	0.48	0.76	0.72	0.66
41	....	....	2.90	8.19	12.57	13.70	14.39
42	....	....	1.31	3.70	11.04	20.09	18.69
43	....	....	5.46	30.38	34.13	34.95	21.79
44	....	....	6.38	1.03	1.13	1.16	0.71
55	....	....	....	....	0.32	0.19	1.09	1.11
56	....	....	....	....	0.24	0.19	0.84	4.02
57	....	....	....	....	0.87	1.12	4.94	13.54
58	....	....	....	....	3.90	0.96	0.22	0.59
71	....	....	....	....	....	....	0.21	0.48
72	....	....	....	....	....	....	3.40	1.51

TABLE 2—MIXTURE SPECTRUM AND CONTRIBUTIONS THERETO OF EACH COMPONENT

(Sensitivity) × (mole fractions) = peak height

Mixture		Propane	n-Butane	Isobutane	n-Pentane	Isopentane
41	10.764	0.290	2.05	6.30	0.885	1.439
42	9.465	0.131	0.925	5.53	1.01	1.869
43	29.075	0.546	7.5	17.10	1.75	2.179
44	1.591	0.638	0.2575	0.566	0.058	0.071
55	0.340	....	0.08	0.0952	0.0545	0.111
56	0.599	....	0.06	0.0952	0.042	0.402
57	2.381	....	0.2175	0.562	0.247	1.354
58	1.527	....	0.975	*0.482	0.011	0.059
71	(*)	....	....	....	(*)	(*)
72	0.320	....	....	....	0.170	0.150

*Negligible.

Indiana's Pocket

(Continued from page 61)

from 5 to 10 bbl. per day at depths of less than 1,500 ft. that were drilled 30 or more years ago. It is impossible to determine what the ultimate recovery of such wells may have been since no records were kept of the early recovery.

The greatest recovery of which we have records is shown for Mount Vernon pool in Posey County where 24 wells have averaged 119,000 bbl. per well from December 1941 to April 1947, (5½ years) from three pay horizons, and the present daily average is 40 bbl. per well. In 8 years, 33 wells in New Harmony pool in Posey County have averaged, to date, 105,000 bbl. per well from eight pay horizons and the present daily production averages 37 bbl. per well. The ultimate recovery is estimated to be at least 180,000 to 200,000 bbl. per well. (Table 1.)

The Pocket area of Indiana has

TABLE 1—POCKET AREA, INDIANA—POOLS PRODUCING OVER 100 BBL. PER DAY (As of April 1947)

Depth of Pay Sands—700 to 3,000 ft. Cost of Completed Well—$4,000 to $25,000.

Pool and county—	Discovery date	No. of wells	No. of pay zones	Daily pipe line runs in bbl.	Cumulative prod. in bbl.	Cumulative prod. per well in bbl. to April 1947	Est. ultimate recovery per well in bbl., primary recovery
Griffin, Gibson	1938	451	10	3,959	21,285,965	47,198	100,000
Kirksville, Gibson	1941	26	4	126	319,095	12,273	18,000
Mount Carmel, Gibson	1941	56	6	1,090	388,038	6,928	40,000
Owensville, North, Gibson	1943	58	4	992	1,351,371	23,299	50,000
Princeton, North, Gibson	1946	12	3	430	53,956	4,488	30,000
Wheeling, Gibson	1943	36	4	273	198,428	5,512	15,000
Caborn, Posey	1940	35	4	393	1,048,849	29,966	60,000
Farmersville, Posey	1945	10	3	237	83,176	4,376	30,000
Heusler, Posey	1938	45	2	313	1,510,722	33,572	75,000
Inman, Posey	1943	24	10	455	675,738	28,114	75,000
Jeffries, Posey	1945	9	3	133	75,904	8,434	30,000
Mount Vernon, Posey	1941	24	3	940	2,470,384	119,725	200,000
New Harmony, Posey	1939	33	8	1,273	3,477,253	105,371	180,000
New Harmony, East, Posey	1946	10	4	309	66,089	6,608	50,000
New Harmony, So., Posey	1944	72	9	2,340	1,684,686	23,398	100,000
Springfield, Posey	1946	19	3	305	120,340	6,334	50,000
Upton, Posey	1944	14	3	344	540,034	38,574	120,000
Vernon Heights, Vanderburgh	1941	26	2	284	313,020	12,040	18,000
Pools less than 100 bbl/day		189		982			
Total pocket area		1,158		15,178			

been more or less like a neglected orphan between two rich neighbors—Illinois and Kentucky. This has been due to the fact that it was practically blanket leased by the major companies in 1936-37 with 10-year leases; consequently, little wildcat development took place. Now that these leases have expired by limitation the independent operator may proceed with wildcatting and subsequent development. The geological structure and producing sands are identical with those of Illinois and Kentucky; consequently, the Pocket area presents good possibilities for profit for the aggressive and courageous wildcatter.

History

The Pocket area of Indiana has a productive history dating back to 1906 from shallow sands less than 2,000 ft. deep and located mostly in Gibson and Pike counties. When Cushing and other fields in Oklahoma were opened around 1912 there was a great exodus of oil men to Oklahoma and most of them forgot to come back. Murphy Oil Co. of Tulsa is one of the few old-time operators in this old area.

The Pocket is not considered a major-company play since the pools are small. They are, however, sufficiently rich and profitable, to be extremely attractive to small operating companies, drilling contractors and individuals. The fields are inexpensive to develop, and cheap to operate.

The local banks are learning the oil business fast and are extending to the operator the needed financial support for additional drilling where sufficient collateral is in evidence. The promotion of wildcat wells is not difficult since there is a ready market for deals in Chicago, St. Louis, and many other points, as well as on the ground. There is a ready market for this oil with pipe-line facilities available to take any and all oil produced at market price which is, at the present time, $2.07 per barrel. Price increases seem inevitable as these justified increases arrive, smaller initial capacity wells may be put on the pump, instead of being plugged. Secondary-recovery operations should prove as lucrative here as elsewhere, particularly in the shallower sands, but with so much cheaper primary oil left to recover, the secondary operations, like deeper exploration, can be left to the future.

Conclusions

In view of the shortage of crude supplies in the Midwest, it would appear to be simply good economics to assume there will likely be a reasonable price increase for local crude, and an increasing supply of the light steel products necessary to develop new production in such vitally affected areas as the Pocket of Indiana. Any increase in production here should be of tremendous value in helping to ease the congested transportation situation.

Meaning of MER Reported by Interstate Oil Compact Committee

by T. A. Morgan

THE designation "Maximum Efficient Rate of Production" for an oil field originated in the agency of the Petroleum Administrator for War, when that body was conducting surveys of the ability of the nation to produce oil for wartime requirements. The term has become associated with the broad general meaning of "that maximum rate of oil production from a field, which, if exceeded during the time period contemplated, will cause such changes in reservoir fluid conditions, as to result in a loss of ultimate oil recovery." The original concept of the term for any particular field recognized that the rate was inherently dependent upon various factors and conditions currently existing within that field, which usually were changing with time.

Subsequent usage of the term has given rise to misconceptions and misunderstandings as to its manner of determination. Involving as it does engineering evaluations of reservoir-control factors, its determination has become to be looked upon by some as the product of the solution of engineering formulas. This fallacy probably arose because so often engineering is thought of as an exact science, rather than as evaluations, based upon technical training and experience, of the summation of all factors, both practical and scientific, affecting given problems. With respect to determining MER, such evaluation is the result of the exercise of balanced judgment upon not only the scientific and technical aspects of the problem, but also upon those factors beyond the scope of the scientific, which must be considered in the practical operation of a reservoir. Regulatory bodies of the oil-producing states, throughout recent years, have evolved a procedure for thoroughly examining all of these factors influencing the control of a reservoir, and for currently fixing an allowable production from each of the various fields, which will conform to the waste-prevention standards and other requirements to be observed by such regulatory bodies, and which will insure to public use the recovery of the maximum amount of oil in each case. The procedure embraces current staff studies of individual reservoir characteristics supplemented by public hearings, where both practical and engineering evidence is introduced by interested parties.

T. A. MORGAN

The regulatory practices committee of the Interstate Oil Compact Commission meeting in the Rainbow Hotel at Great Falls, Mont., on August 11, 1947, presented this report on maximum efficient rate of production. The committee previously had met July 1 at Oklahoma City, with representative engineers of the oil and gas industry, for a general discussion of the term "Maximum Efficient Rate," its origin, and its utilization by the oil industry by state regulatory bodies, and federal government agencies. T. A. Morgan, director, Conservation Division, Kansas Corporation Commission, is chairman of the 19-member committee.

Reservoir factors for consideration in proper control methods have broadened with time, as the knowledge of the forces governing the retention of oil in the reservoir, and of the manner in which the reservoir energy may be controlled for more efficient production, has developed. The science of reservoir control may be considered at this time to be in the elementary stage. This is evident from the fact that less than half of the original oil has been recovered from our now depleted or nearly depleted fields. With the advance of knowledge of efficient operation of oil reservoirs, new factors will be found for consideration in the determination of efficient production rates. These factors will need to be developed by the engineers of the industry and of the regulatory bodies. Only after exhaustive hearings, wherein all of the technical and other aspects of the producing characteristics of a field are laid before the regulatory bodies, can such bodies act with certainty in the determination of a maximum efficient rate of production.

In making separate studies, currently, of each producing field, the scope of the investigations should be comprehensive. Beginning with re-

gional geology, sedimentation, stratigraphy, and continuity of producing zones, the reservoir must be evaluated from every angle. The local conditions within the oil-producing formation itself should be given consideration. This includes its size; shape, thickness of the sands; producing horizons; type of closure; and porosity and permeability of the producing formation itself, and its interstitial or connate-water content, as determined from actual core analysis in the laboratory.

A study of the energy available for expulsion should be made. This includes type and potentiality of oil-expulsion forces, whether water or gas drive, or both; whether a gas cap exists; whether it is likely to be maintained, expanded, or contracted during the depletion of the field under proposed plans for operations.

The characteristics of the oil itself should also be made a matter of study and record; whether it be paraffinic or naphthenic as to base; its specific gravity in the reservoir and in the stock tank; the amount of gas in solution in its reservoir state; the rate at which this gas will be liberated from solution as the reservoir pressure declines; whether or not the oil in its reservoir state is completely saturated with gas; if undersaturated, at what point in the pressure drop of the reservoir will its liberation begin; the amount of pore space in the reservoir occupied by that gas in solution which will be liberated from the oil before its delivery to the pipe lines; the change in fluidity or viscosity of the oil in the reservoir as the gas is liberated through reservoir pressure drops; the extent to which the gravity drainage of the oil will be affected by such change in viscosity, through the liberation of gas; the probable gas-oil ratios to be encountered in the reservoir at each state of reservoir pressure drop; and the varying permeability within the reservoir to oil, gas, and water, throughout the entire depletion stage.

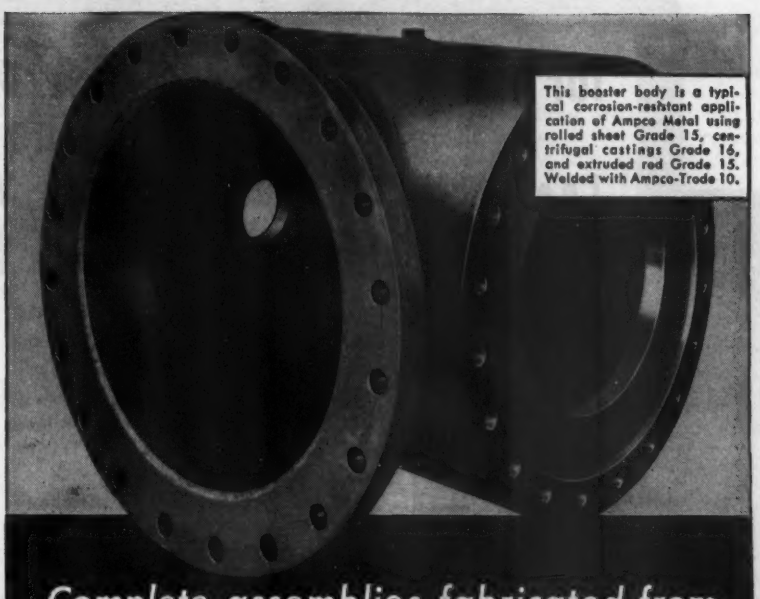
Requirements in Fixing MER

Each reservoir has an individuality all its own. Attributes peculiar to one field are never duplicated in like combinations in any other field. For this reason the exact MER for any reservoir may be difficult to determine but for all practicable purposes reasonable limits of production rates may be found beyond which injury or waste would obviously occur. Generally it may be said that the requirements to be considered by the regulatory bodies in fixing MER are:

That the oil withdrawal rate be such that water drive, where effective, be allowed to advance evenly without entrapment of oil in less permeable areas.

That the field output, where possible, be limited to the rate of water

(Continued on page 99)



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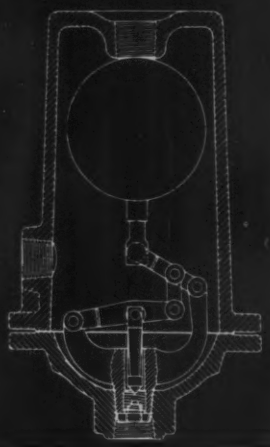

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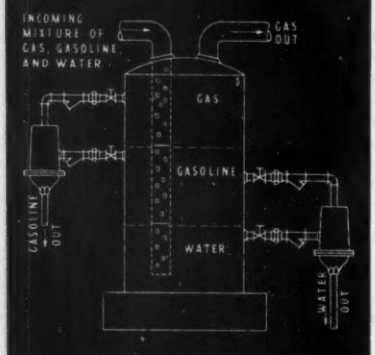

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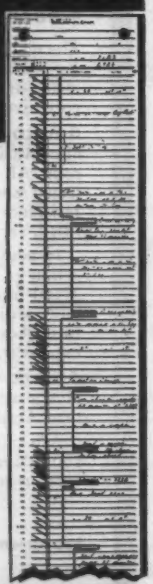

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K-25 INDUSTRIAL FIBER

Water Locator

(Continued from page 79)

duction are shown in Table 1. The table gives data on 15 of the 17 successful surveys.

A 3,078-ft. well located in Jal pool of Lea County, New Mexico, provides an excellent case history to illustrate the procedures involved in a water locator survey. This well was drilled about 19 years ago and had been a gas producer but water killed the well.

The first run made by the survey company was to check water level and total depth. This run gave a reading of 40 on the indicating meter at the surface. (See survey graph, Fig. 4.) By adding electrolyte to that portion of the water covering open hole, this reading was increased to 200. After the 200 reading was obtained, a dart bailer was run to bail off the well's static head, thus allowing a fresh entry of formation water into the bore hole. This fresh entry of water diluted the acid mixture at the point of entry thus indicating the water source. To locate definitely the water source, a total of six runs were required as follows:

Run 1—Water check and total depth. Meter reading of 40.

Run 2—Dumped 21 gal. of electrolyte and ran check. Meter reading of 200 from 2,940 to total depth.

Run 3—Pulled off 2 bbl. of water and ran dilution check.

Run 4—No fluid pulled off, a section from 3,042-56 showing water.

Run 5—Pulled off 2 bbl. of water and ran dilution check. Water entry from 3,042-56 indicated as in runs 3 and 4.

Run 6—Final total depth check. No notes taken.

This well started to produce gas after the first 2 bbl. of water were bailed off in run 3 and gas production increased gradually until completion of survey.

A plastic liner was run following the survey, but it apparently was damaged while going into the hole. Consequently a second survey was run and another liner set which successfully shut off all water intrusion.

Details of Survey

In conducting a survey, the operator of the well has the following responsibilities:

1. Have the well in condition for the survey.
2. Provide a unit with sand line and mast for bailing.
3. Provide 3 or 4-in. pipe to make a bailer to dump electrolyte on the hole.
4. Provide a bailer to remove fluid from above electrolyte to lower from static pressure.

The service company conducting the survey has the responsibility of providing the following:

1. Bailer attachments for 3 or 4-in. line pipe to distribute electrolyte.
2. Electrolyte material.
3. Water locator complete with meter to give depth and electromotive force developed by the locator.
4. Graphic presentation of data obtained.

Unsuccessful Surveys

As mentioned earlier, the source of water entry could not be located in five of the Permian basin surveys. An analysis of these five attempted surveys shows the following:

Case 1—Hobbs pool: Open hole was contaminated with b.s. and carbonate scale. Fluid in hole would not condition.

Case 2—McElroy pool: Well had a shot hole. Water level would recede and then well would kick off. After well died and reached static pressure, water would not condition. Evidence of migration of fluid in the open hole was present.

Case 3—McElroy pool: Well had a shot hole. Water in hole receded at the rate of 125 ft. per hour in 7-in. o.d. pipe. Water would not condition.

Case 4—Maljamar pool: Well had a shot hole. Water level receded during attempted survey. Well kicked off and flowed. Failed to condition water in hole after well died.

Case 5—Robertson pool: Test before attempted survey showed 50 per cent water. Fluid level continued to rise throughout attempted survey. Water in hole failed to condition.

As readily can be seen, the trouble was in the conditioning of the hole, and the survey itself was not attempted. A receding water level can sometimes be overcome by shutting in offset wells. There are two possible remedial measures for wells that continue to fill up while an attempt to condition is being made. First, the conditioning can be delayed until a static condition is reached, if it does not kick off and flow. Or secondly, the operation of running the water locator can be speeded up after the dumping of the electrolyte so as to catch the dilution.

Factual material in this article on the 24 Permian Basin surveys was compiled by Jack M. Moore, district engineer, Dowell Incorporated, Midland, Tex.

SUMMARY OF 15 PERMIAN BASIN WATER LOCATOR SURVEYS

State, pool and County—	Formation	Casing depth (ft.)	Total depth (ft.)	Location of water entry (ft.)	Source of water entry and plugging material used	Prod. before plugging		Prod. after plugging	
						Oil	Water	Oil	Water
Texas, McElroy, Upton	Grayburg-San Andres	2,651	2,797	2,776-88	Intermediate—Plastic	15%	85%	See Note 1	
Texas, Strawn-White-Baker, Pecos	Penn Strawn	7,493	7,493	6,790-6,808	Casing perforations—Cement	150 B/D	99 B/D	See Note 2	
Texas, South Cowden, Ector	Permian	3,861	4,384	3,980-92	Intermediate—Steel liner and cement	50%	50%	See Note 3	
Texas, Powell, Crockett	San Andres	2,594	2,601	2,594-96	Casing seat—Plastic	10%	90%	See Note 4	
Texas, Block 12, Andrews	Clearfork	6,994	7,160	6,984-96	Casing seat—Cement	10-50%	50-90%	57 B/D	0 B/D
Texas, Yates, Pecos	Yates	1,302	1,302	1,388-1,424	Intermediate	10 B/D	47 B/D	See Note 5	
New Mexico, Arrowhead, Lea	Permian	3,715	3,849	3,814-30	Intermediate—Packer	20 B/D	200 B/D	300 B/D	0 B/D
Texas, South Cowden, Ector	Grayburg	3,944	4,343	4,328-43	Shot hole—Plastic	30%	70%	See Note 6 70%	30%
New Mexico, Maljamar, Lea	Grayburg	3,550	4,129	4,028-36	Intermediate—Plastic	20%	80%	See Note 7 100%	0%
New Mexico, Paddock, Lea	Paddock	5,150	5,168	5,168	Bottom of open hole—Plastic	50%	50%	See Note 8	
Texas, Wildcat, Garza	San Andres	2,807	3,070	3,062-70	Bottom of open hole—Plastic	1%	99%	See Note 9	
Texas, Wildcat, Garza	San Andres	2,807	3,049	3,049	Above or around plastic plug—Plastic	1%	99%	See Note 10	
New Mexico, Jal, Lea	Permian	2,990	3,078	3,040-56	Intermediate—Plastic liner	0%	100%	See Note 11 100% (gas well)	0%
New Mexico, Maljamar, Lea	Grayburg	3,552	4,097	4,097	Bottom of open hole—Plastic	70%	30%	100%	0%
Texas, Garza, Garza	San Andres	2,770	3,050	3,044-50	Bottom of open hole—Cement	1%	99%	90%	10%

Note 1. Plastic reduced water but not a complete shutoff.
Note 2. Bridged back and squeezed this set of perforations and shutoff water.
Note 3. No water produced after setting of liner.
Note 4. Large reduction in water after plastic plugging.
Note 5. Water entry indicated throughout pay zone—no remedial work attempted.
Note 6. Packer set above water entry and hole acidized. Packer left in hole for production.
Note 7. Hole was shot, two stages of plastic run.
Note 8. Plugged with 2½ ft. plastic with no immediate change in water cut. Produced clean oil 60 days later without further remedial work.
Note 9. Plastic shutoff water but it showed up again after acid treatment.
Note 10. This job a followup on one above. Plugged again with plastic and acidized. Results not available.
Note 11. Plastic liner apparently damaged while going into hole. No reduction in water. A second survey and another liner shut all the water off.

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Knockoff Device Provides Safety in Operation

by Neil Williams

A NECESSARY auxiliary in any central power, back crank or other multiple-well pumping installation is the device for connecting or disconnecting individual wells of the system. Such a device, known as a knockoff, is needed for each well in the installation, and is located at the place where the pull bar from the power source hooks onto the rod line to the well.

Knockoffs are of sundry descriptions. Not only is there commercial equipment available from various manufacturers for this purpose, but individual operators in many instances devise their own. Each generally incorporates different ideas in design, construction, and ways of manipulation.

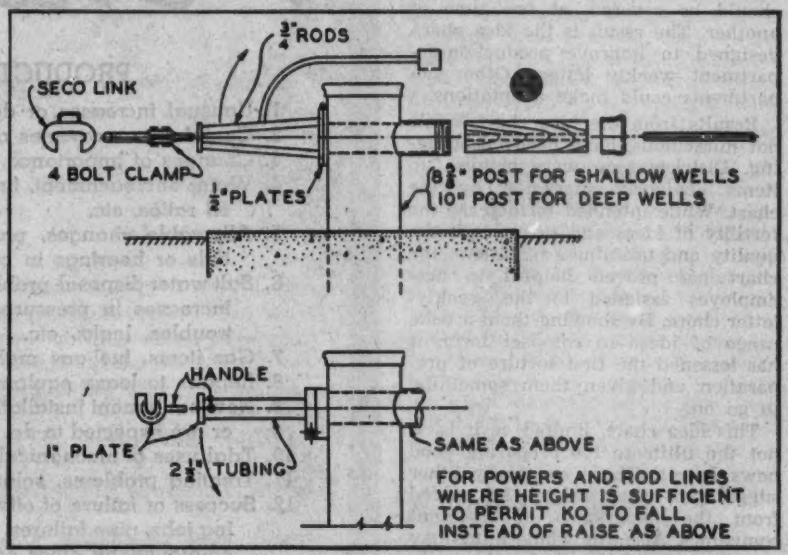
Since individual wells are connected or disconnected while the power source is in motion, operation of the knockoff must be such that engagement or disengagement of the rod line and pull bar can be accomplished simply and quickly and without danger of catching or smashing fingers or hands of the operator. The equipment also must be capable of holding the well load when the rod line is released from the power source.

Accompanying pictures and drawings show the design and method of operation of an unusually safe and easily manipulated knockoff which has been devised by field men and used by Sinclair-Wyoming Oil Co. in its Lost Soldier field in Wyoming.

The supporting post consists of a short piece of 8⅝-in. pipe (10 in. pipe for deeper wells) set with bottom end embedded in concrete-slab base. The guide and bearing for the rod line is a cylindrical wooden block which fits inside a nipple of 4-in. pipe inserted through the side of the post near the top at the rod-line level. The rod passes through a hole bored lengthwise through the center of the block. The block is split lengthwise into halves to permit travel and replacement without having to pull the rod through the post. A metal cap with hole drilled through the center for the rod screws on the end of the 4-in. nipple housing to hold the wooden block in place on the inside. The post is filled with cement to add to its strength.

The knockoff is a semiconically shaped bracket formed by three ¾-in. rod members with inverted U-shaped ½-in. steel endplates. This is hinged at the top side of the larger or basal endplate to the top edge of the knockoff post to swing up and down over the end of the rod line. When the knockoff is lowered into horizontal position to engage the rod line, the larger, or hinged endplate faces against a ½-in. steel backplate welded to the side of the post to pro-

(Continued on page 99)


¾" RODS
SECO LINK
4 BOLT CLAMP
½" PLATES
8⅝" POST FOR SHALLOW WELLS
10" POST FOR DEEP WELLS
HANDLE
1" PLATE
2½" TUBING
SAME AS ABOVE
FOR POWERS AND ROD LINES WHERE HEIGHT IS SUFFICIENT TO PERMIT KO TO FALL INSTEAD OF RAISE AS ABOVE

Top: Design of knockoff for use when rod line is relatively low to ground. Bottom: design of knockoff for use when height of rod is sufficient for knockoff to fall

Left: Knockoff in raised position (held by weighted counterbalance arm) when well is pumping. Right: Knockoff in lowered position to disconnect well. When clamp on end of rod line engages knockoff at end of line's forward stroke, Seco link is lifted out

Improved FIELD REPORTS

by Lawrence Lemmons

THERE'S a good chance that every production man from head roustabout to executive vice president has at one time or another worried about preparing a weekly letter. These operational reports to higher headquarters are pretty much standard procedure in the oil-producing business.

A good many men feel that they would have to be literary experts to produce a newsy and complete letter. But more important than writing ability or editorial talent is IDEAS. Usefulness, but also readability and real life in a weekly letter come from ideas, lots of things to say—different angles and viewpoints—possibilities and estimates—expectations.

This is where the idea chart may help. The writer has classified the subject matter of scores of weekly letters to see just what are most of the important items that possibly should be covered, at one time or another. The result is the idea chart, designed to improve production-department weekly letters. Other departments could make adaptations.

Results from the idea chart, while not miraculous, have been encouraging. Districts soon were making up items obviously suggested by the chart. While intended to increase the fertility of ideas and to improve the quality and usefulness of letters, the chart has proved helpful to new employes assigned to the weekly-letter chore. By showing them a wide range of ideas in compact form, it has lessened the first torture of preparation and given them something to go on.

This idea chart, limited as it is, is not the ultimate for preparing good news letters. There are many other suggestions that might be added from the experience of different companies. Also, the whole thing may seem amateurish to people who write sparkling news letters without apparent effort. However, as a starter and developer, the chart is a handy gadget.

Let's assume that the district superintendent has just received a carbon copy of the weekly letter written by Smith, the district engineer. By using the idea chart and asking a few questions of the clerk and foremen, Smith prepared his letter report in 45 minutes. The superintendent glances at the headings: Spring Painting Starts—New Brand of Paint Used—Truck Driver Says Mileage Helped by Conditioner—Storm Damages Window in Warehouse—Unusual Hookup Gets Fish at Jones Well—Pipe Now Orderly at New Yard—Charley Catches 10-Pounder at Goose Lake—Engineers Are Half Finished With Reserve Estimates—Picnic 2 Weeks Away, Record Turnout Expected—Obsolete Equipment Boosts Lifting Costs, Analyses Under Way.

The engineer might have added

✓ Check this

PRODUCTION VIEWPOINT

1. Unusual increases or decreases and reasons for them.
2. Cumulative recoveries of possible interest.
3. Changes of importance in gas-oil ratios.
4. Water encroachment, first water produced, changes in water-oil ratios, etc.
5. Allowable changes, proration, producing days, new potentials or hearings in connection with them.
6. Salt-water-disposal problems, methods, or contemplated work; increases in pressure, reduction of intake capacity, scale troubles, leaks, etc.
7. Gas items, fuel-gas problems.
8. Repairs to lease equipment.
9. New equipment installations, what they are doing, have done, or are expected to do.
10. Trial uses of mechanical devices and chemicals.
11. Treating problems, solutions, effect on oil, gravity, etc.
12. Success or failure of offset and other workovers, unusual fishing jobs, pipe failures, new operating methods or equipment employed by other operators.
13. Repressuring and other secondary-recovery activities.
14. Progress of lease cleanup or painting projects.
15. Changes in pipe-line connections, new connections, etc.
16. Happenings of general interest in the district such as personnel changes, safety meetings, vacations, operating procedures, associational meetings, fires, thefts, etc.

ENGINEERING VIEWPOINT

1. Brief interpretations of bottom-hole-pressure surveys.
2. Fluid-level commentaries.
3. Production declines of outstanding importance.
4. Technical installations such as vapor-saving equipment, engine revisions, and performance of new mechanical devices.
5. Brief summaries of results of field studies.
6. Accomplishments of engineering associations, reports of their meetings, etc., all very brief.
7. Results of reconditioning and workover programs.
8. Current engineering projects, such as recommendations, mapping, individual well studies, etc.

IDEA CHART HELPS ORGANIZE THOUGHTS — MAKE BETTER REPORTS

that while nothing outstanding had happened in the district, neither had misfortune. There had been no lost-time accidents in 6 months, no labor trouble, no allowable inequities, no fires, no thefts.

Weekly letters are probably here to stay. Some companies have monthly letters along with or in place of weekly letters. Whatever the form or the frequency, the letters can give expression to happenings and interpretations that seldom get into official correspondence. Somebody, for instance, might like to know that the pipe-line walker has discovered every leak for 5 years in time to prevent property damage and resulting litigation.

There's always more to say in any sizable district than simply, "routine operations."

IDEA Chart

DRILLING AND DEVELOPMENT VIEWPOINT

1. Mud difficulties.
2. Structural relationships.
3. Factors contributing to unusually rapid or unusually slow drilling progress.
4. Seismic activities.
5. Directional-survey interpretations.
6. Blowouts and mechanical operating problems.
7. Unusual well surveys such as caliper, radioactivity, and water-locating devices, or sometimes the differences observed in the results of two different surveys on the same well.
8. Fuel problems such as maintaining water supply, gas, oil, butane, etc.
9. Reservoir reactions during drilling of development wells, if noticeable.
10. Accidents, such as derrick collapse, falling equipment, fires, etc.
11. Weather obstacles like floods, wind, bad roads, difficult location.
12. Trouble with drilling crews.
13. Spacing patterns, deviations from them, and reasons.
14. Unusual shutdowns.
15. New completion procedures.
16. Stepups or slowdowns in drilling activity.

GENERAL VIEWPOINT

1. News items of interest such as property sales, trade deals, wage announcements.
2. Crude-oil price changes and how they affect the district.
3. Associational and committee meetings, their findings, recommendations, your opinion, etc.
4. News of casing-head gas, such as price changes or change in gasoline content, pressure base, etc.
5. Employe attitude toward company policies or plans, insurance, reasons for attitude, etc.
6. Personal items of interest such as annual picnics, visitors, new employes, etc.

Knockoff Device

(Continued from page 97)

vide a secure base. In this position, the opposite or smaller endplate, with the rod line fitting into the U opening, engages the four-bolt clamp on the end of the line to stop the forward stroke of the line.

Length of the bracket is such that the clamp is engaged just before the rod line reaches the end of its forward stroke. Connection between the rod line and pull bar is by means of a Seco link which hooks into the two respective U-bolt ends. As the pull bar continues to move forward to the end of the stroke with the rod line held by the knockoff, sufficient slack is created and tension relieved so that the Seco link can be lifted out and the rod line disengaged from the pull-bar connection.

To connect a well it is only necessary to slip the Seco link into place as the pull bar reaches the end of its forward stroke. On the back stroke with the rod line engaged and the well load taken off, the hinged knockoff, provided with a weighted counterbalance arm, automatically swings upward out of the way in operation.

A slightly different version of the knockoff has been designed for use where the height of the rod line above the ground level is sufficient to permit it. In such cases, a half section of 2½-in. tubing split lengthwise is provided instead of the bracket made with the three rods. It is hinged to the post on the under side of the rod line and falls out of the way instead of swinging upward when not in use. Inversely, it is lifted into place to hold the rod line when the pull bar is disconnected.

Meaning of MER

(Continued from page 93)

encroachment, whether natural or artificial.

That, in the absence of reinjection or reservoir gas, gas-oil ratios be held to a minimum, and where governing factors permit, the oil be produced only from lowest gas-oil-ratio wells.

That in those fields where recovery is aided by gravity segregation, the withdrawal rates be so adjusted as to favor such segregation.

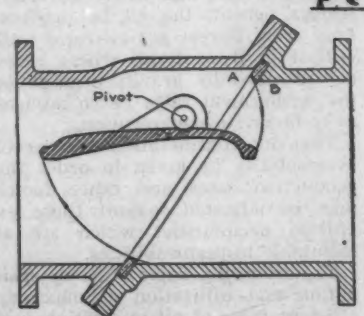
That due consideration of reservoir permeability be given in order that production rates and other factors may be adjusted to suit those expulsion peculiarities which are attributable to permeabilities.

The foregoing depicts the determination and utilization of maximum efficient rates of oil production from reservoirs, as practiced by the regulatory bodies of the oil-producing states. Constant interchange among the states of new developments and practices, both scientific and administrative, is being made through I.O.C.C. regulatory practices committee.

THE "CUSHIONED CLOSING" OF

CHAPMAN TILTING DISC CHECK VALVES

Prevents Water Hammer



Cross-section of the Chapman Tilting Disc Check Valve illustrating the way that the balanced disc is supported on the pivot, with arrows showing the travel of the disc. A feature of the design is that the disc seat lifts away from the body seat when opening, and drops into contact when closing, with no sliding or wearing of the seats.

The smooth performance of a balanced hinge-pinned disc gives Chapman Tilting Disc Check Valves a quiet, "cushioned closing." There's no slamming, as in ordinary check valves, and therefore no destructive pipe-line stresses. This means that water hammer and its resultant vibrations and strains in pipe lines are eliminated.

This unique check valve not only reduces maintenance costs but effects savings of from 65% to 80% in head losses over conventional type check valves. And Chapman Check Valves are available in either iron or steel.

Send for bulletin containing complete information.

The Chapman Valve Mfg. Co.

INDIAN ORCHARD, MASS.

BOOKS

BIBLIOGRAPHY FOR PHYSICAL BEHAVIOR OF HYDROCARBONS UNDER PRESSURE AND RELATED PHENOMENA. By Donald L. Katz and Michael J. Rzasa. Published by J. W. Edwards, Inc., Ann Arbor, Mich. $4.

Physicists and physical chemists investigated the behavior of organic compounds under pressure while developing laws and theories some 40 to 60 years ago. In the course of their experiments, considerable data were taken on the behavior of hydrocarbons which form the background for present-day engineering calculations.

The successive discovery of deeper oil and gas fields with correspondingly higher pressures culminated in about 1930 in the discovery of Turner Valley, Big Lake, Oklahoma City, and Kettleman Hills oil and gas fields. At about this time there was an influx of engineers and scientifically trained people into the production phase of the oil and gas industries. These technical men were trained for the most part in the period from 1925 to 1935, by which time the physicists and physical chemists at least in part no longer emphasized the nature of substances under pressure. The behavior of fluid mixtures was deleted from elementary texts and courses so that the classical research of the nineteenth century was unfamiliar for the most part to petroleum engineers. From time to time during the past 15 years, the early knowledge developed by physicists and chemists has been brought to the attention of the oil and gas industry.

The voluminous literature of the physicists and chemists in the latter part of the nineteenth century made difficult a thorough literature search in a few days or even weeks. A grant was made by the Horace H. Rackham School of Graduate Studies at University of Michigan. Some 18 journals, many in German and French, were selected for the survey in the period from 1860 to 1910. Some 675 references were found concerning the behavior of the hydrocarbons under pressure and related phenomena before 1910. In this period abstracts of the articles are included in the bibliography. To complete the bibliography to the present day, some 1276 additional references were found from 1910 to 1945 inclusive.

Many of the early articles showed an amazing knowledge concerning the behavior of fluids under pressure and reported experiments not familiar to present-day engineers. A brief sketch of these early articles is given to indicate the progress of knowledge relative to oil and gas under pressure. In part 2 of the bibliography some 15 early articles are reproduced to give the reader an insight to the early scientific background.

STRATIGRAPHIC SECTIONS OF MESOZOIC ROCKS IN CENTRAL WYOMING. Prepared by J. D. Love, H. A. Tourtelot, C. O. Johnson, R. M. Thompson, H. H. R. Sharkey, and A. D. Zapp, geologists with the U.S.G.S. Issued by Geological Survey of Wyoming, University of Wyoming, Laramie. $2.

Details of sequences of sedimentary rocks measured at seven places in Fremont County are described in the bulletin, with emphasis on character, thickness, areal distribution, and relative positions of potential oil-producing sandstones and limestones throughout the state. The probable depth to possible oil-producing formations and the nature of rock sequence to be drilled in test wells within the basin can be determined from the measured sections. A uniform terminology for the rock units has also been established. Facts are included which are pertinent in the search for new oil fields of the stratigraphic-trap type and porosity-trap type and in the evaluation of untested sandstones on anticlinal structures.

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It isn't the original H.P. rating of an engine that counts but rather, the number of H.P. Hours of power service it will deliver during its lifetime. This, in the final analysis, is the real measure of engine value.

Wisconsin Air-Cooled Engines deliver the most H.P. Hours because they are designed and built for rugged, heavy-duty service. For example: every Wisconsin Engine, from the smallest to the largest, runs on Timken tapered roller bearings at both ends of the crankshaft to take up end-thrust and provide the best protection against bearing failure . . . at the same time assuring a smooth-running engine. This is just one typical detail that stands back of "Most H.P. Hours" of on-the-job power service.

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Wright Engines . . . Total time on plane and engines as of July 25, 1947 only 85 hours.

Radio Equipment . . . Nine channel V.H.F. runway localizer, radio altimeter, Collins eleven channel 100 watt transmitter, liaison and command receiver.

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Novel Detector Quickly Locates Leaks in Heat-Exchanger Tubes

SMALL leaks in heat-exchanger tubes and tube sheets which are difficult to locate by ordinary methods may be detected easily with the stethoscope described here. The device, designed by Maynard Keaton, Toledo refinery, Pure Oil Co., amplifies sounds produced by compressed air escaping through the leak. In exchanger installations where normal methods, such as water pressure, fail in producing the desired results, this detector is said to show excellent performance. For the usual on-the-job inspection of exchanger equipment considerable time may be saved over ordinary methods with the detector since only the channel cover of the exchanger needs be removed.

This detector device has proved very effective in the following cases where ordinary methods are ineffective and impractical in locating tubing leaks:

1. Where an exchanger is located in a vertical position with the channel end up. Any leakage through tubes will drop to the floating head and disperse to all tubes.

2. In the case of bowed tubes a small leakage would accumulate in the low spot of the tube and not be noticed.

3. In cold weather ice may form on a failed tube and prevent the water passage through a small hole.

4. Extremely minute leaks, such as roll leaks, may not permit the passage of water.

The detector, somewhat similar to a physician's stethoscope except for the long sound-conductor probe, is light and portable

Sounds Can Tell Character

While testing with water it is possible to gather scale and carry it to the perforated spot stopping the leak. Leakage is also difficult to locate with water because most heat exchangers slope to the floating tube sheet, causing the water to flow to this point, and, reappearing through a different tube, thereby causing the wrong tube to be plugged.

Bottom Water is a drain on profits

Eagle Lead Wool

shuts out Bottom Water!

To insure an uninterrupted flow of oil from your wells, banish bottom water with economical Eagle Lead Wool. This finely stranded metallic wool, tamped around the hole, effectively seals every crack, becomes a permanent, non-corrosive plug. Packed in convenient 50-pound sacks—easy to place in special cartridge-shaped Eagle Wire Containers sized to fit all casings.

These 3 Eagle Bearing Metals meet most requirements

Eagle Dreadnaught — for extreme speed and heavy-duty conditions.

Eagle Outlasta — for medium speed and average-load conditions.

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EAGLE LEAD WOOL

Seals off Bottom Water— keeps 'em flowing!

THE EAGLE-PICHER COMPANY

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Normal procedure in testing for leak locations with the device specifies removal of the channel cover plate and application of air at 100 psi. in the exchanger's shell section. After placing the listening device to both ears, as indicated in an accompanying photograph, the operator places the tip of the sound-conductor tube over the end of one of the exchanger tubes. In carrying out the

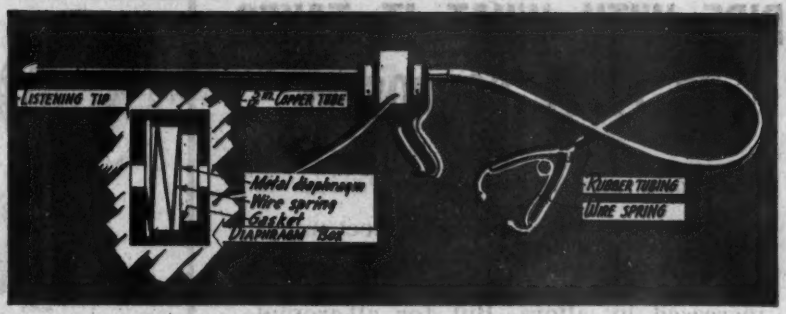
Checking heat exchangers in Pure's Toledo refinery

inspection operation each tube is so tested until all tubes have been checked; in many cases leaks may be isolated without inspecting all tubes in the exchanger.

Difficulties With Water Tests

Interpretation of the intensity and pitch of the sound produced by various types of leaks as well as their position with respect to the listening tube tip supplies the answers in locating and classifying leaks. A tube rupture is identified by an extensive noise at the particular tube end whereas a roll leak is detected by placing the listening-tube tip between tube ends. Roll leaks are isolated by taking several tests on the tube sheet in the region where the sound is of greatest intensity. Leaks in the floating head are indicated by noises in a series of tubes around the periphery of the tube sheet.

Construction details of the device are shown in the accompanying drawing.



Design layout of the detecting device, with details of the diaphragm box which is mounted within the trigger-grip handle

It's a fact!

ONLY CHROMATES CAN MAKE THESE CLAIMS

NO OTHER CHEMICAL has as powerful an inhibitive influence toward the corrosion of iron or steel in the presence of water.

NO OTHER CHEMICAL is as effective against bimetallic corrosion.

NO OTHER CHEMICAL provides as satisfactory protection in high-chloride water or brines.

NO OTHER CHEMICAL completely nullifies the corrosive effect of aeration.

Mutual Chromates are being used to prevent corrosion in an ever-increasing number of applications. In most cases the amount of Chromate is small, and the cost low. As a result Chromates are generally regarded as the most effective and economical corrosion inhibitors.

Mutual Chromium Chemicals are preferred throughout industry because of their high quality and dependable uniformity. Shipments are made from our two complete plants at Baltimore and Jersey City and from dealers' warehouses throughout the United States and Canada.

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Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, 1015 Peoples Gas Bldg., Chicago 3, Illinois

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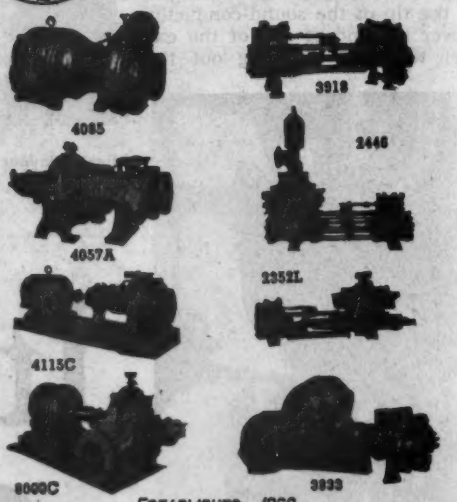

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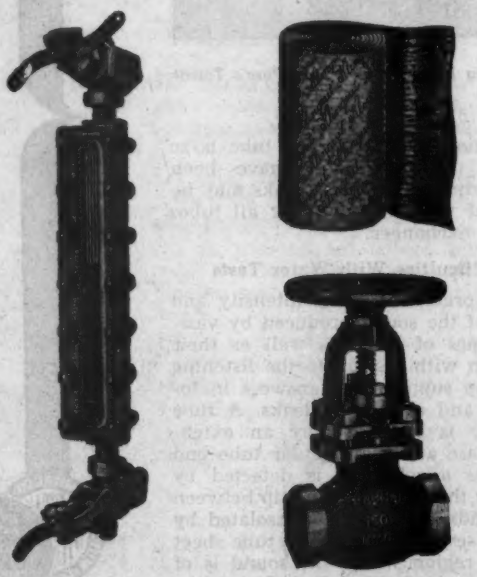

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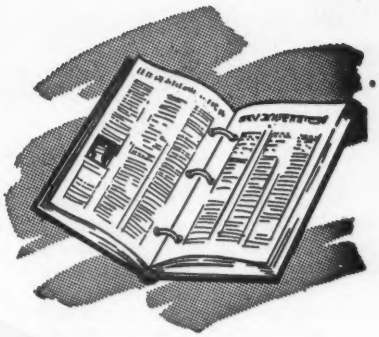
The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL



Shaft Alignment

FAULTY alignment of a centrifugal pump and its driver is an ailment that has contributed more than its share to unnecessary service and replacement of damaged parts. Piping strains, settling of foundations, shocks, etc., may change the relationship of the two rotating shafts. Flexible couplings compensate for small variations in alignment but will not always avoid ruined shafts, stuffing-box parts, bearings, or the coupling itself. In various pin-and-socket types of flexible couplings, the pins tend to wear slightly conical or tapered, and when this condition is severe they exert longitudinal force against the pump shaft causing unbalance and undue wear of bearings or sometimes contact of the rotor and the case.

If the flexible coupling is of the laminated type, it is advisable to dismantle it at overhaul periods and carefully check the disks. Under the driving load, even though the elastic limit of the material may not be approached, repeated alternating flexures tend to harden the material and may cause the disks to act as if they were stiff springs which may force the pump shaft far enough to cause rubbing and consequent rapid wear. If the disks show signs of having become tempered by service, or if they will not lie flat when removed from the coupling, they should be replaced because they are usually too thin to be straightened by any means regularly available to plant operators.

On a coupled pump unit it is generally difficult to check alignment accurately unless each shaft is free to rotate independently of the other. With some couplings this is accomplished by removing the coupling bolts or pins or by removing the extension piece between the halves of the coupling exposing the coupling hubs. Some couplings, generally on small units, are fitted with a connecting flexible element which cannot be removed without sliding one half back on its shaft (frequently difficult) or sliding the motor back on the base. With such couplings, as long as there is no evidence of binding, reasonable alignment can be secured with the coupling intact.

Suggested Method

The following method, with possibly a few variations, may be followed in checking alignment with virtually all types of couplings.

Place a straightedge across the top and side of the coupling and with a feeler gage check the faces of the coupling halves as illustrated in Fig. 1. When the peripheries of the coupling halves are true circles of the same diameter and the face is flat, exact alignment exists when the straightedge lies squarely across the rims at all points and the distance between the faces is the same at all points.

Paper shims or metal "dutchmen" used by some manufacturers should be used under one or more legs of the driving element in making adjustments. Coating one side of the paper shims with clear shellac when finally placing them will simplify replacement of the unit and decrease the amount of trial shimming required to regain the original setting.

With a steam-turbine-driven unit, final alignment should be made with the turbine heated to its operating temperature. Similarly, if the pump handles a hot liquid, allowance must be made for elevation of the shaft when the pump expands.

The faces of the two coupling halves should be checked to make sure they cannot rub or exert pull on either the pump or the driver. The amount of this clearance will vary with the size and the type of coupling used. A good rule is to allow enough space for unhampered endwise movement of the shaft. On motor-driven units the magnetic center of the motor will determine the running position of the motor half coupling.

If a pump is directly connected by gears to a motor or engine the pinion should not mesh with the gear too closely. A slight amount of clearance or backlash is desirable. For small and medium-sized gears a clearance of 0.005 to 0.008 in. is about right. For large gears the clearance should approximate 0.010 in. per inch of circular pitch. If considerable moisture is present, allowance must be made for expansion of fiber pinions.

There must be a perfect bearing across the entire width of the pinion and gear faces. Coat the gear teeth lightly with red lead, turn the gear by hand and observe the contact marks on the gear teeth. These should be equal for the entire length of the tooth.

At time of overhaul the impeller should be checked for paraffin, grease, or foreign material because even extremely small deposits may unbalance the pump and cause wear. The fluid passages in multistage pumps are particularly important. In cleaning these or the impeller, sharp cleaning tools such as files, hacksaw blades, or scrapers should be avoided. Hard deposits of rust or corrosion scale should be ground off by rubbing with a fine grade of emory cloth mounted on a rounded stick.

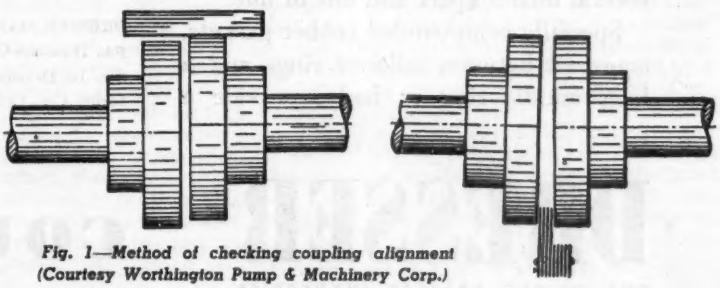
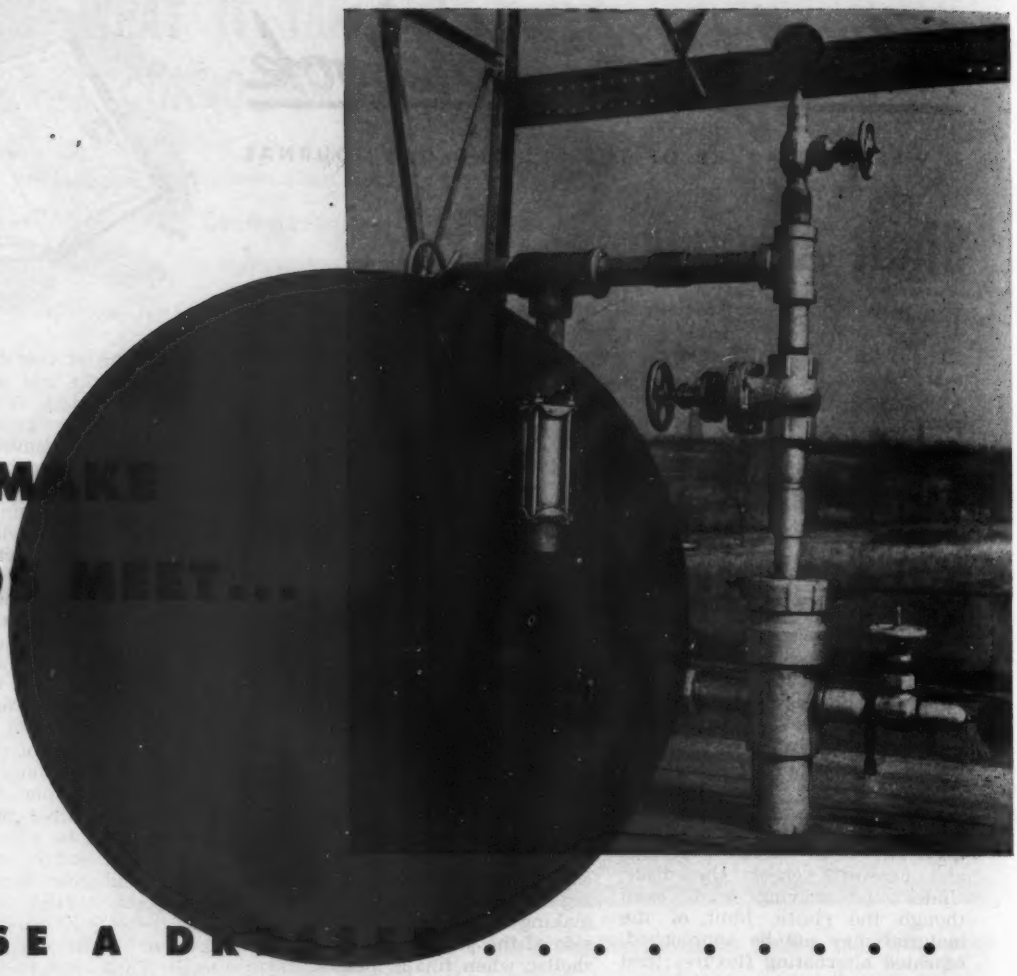


Fig. 1—Method of checking coupling alignment (Courtesy Worthington Pump & Machinery Corp.)

No. 160 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa



TO M[illegible]KE
END[illegible] MEET . . .

USE A DR[illegible] . . . . . .

What do you do with a hookup when pipe ends don't quite meet?

Old hands in the oil business have a ready answer:

"Use a Dresser", they'll tell you.

The Dresser Long Coupling (Style 40) shown here is what they mean. It will make a permanently tight, vibration-proof joint even if the pipe ends are several inches apart and out of line.

Specially compounded rubber gaskets, squeezed between follower rings and a long middle ring or body, provide a flexible, high-pressure "pack" around both pipe ends. All parts are factory-built and tested, then assembled and delivered to you complete—ready to install.

Get them from your oilfield stores who can get overnight service throughout the southwest from our Houston Warehouse. Write for complete information.

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MODERN Rotary DRILLING

Steam-Generating Plants—2

INCREASES in sizes and working pressures of drilling-rig boilers and in number of boilers used with a rig already have been mentioned (Installment 35). Other new developments concerning the steam-generating plant of a rotary rig, and designed to meet the requirements of present-day drilling, include some changes in details of construction and design of the boilers and general bettering of efficiency of operations through improvement of auxiliary equipment.

Construction and Design

One important change is the introduction of welded boiler-plate construction. With no rivets and overlaps, maintenance cost is reduced by elimination of joint failures and by making easier cleaning and washing of the boiler. A novel feature on many types of modern boilers is elimination of the dome. This change has been made possible by two factors. First, with high pressures now used the volume of steam is considerably reduced so that less space is needed for separation. Second, the barrel diameter of these domeless boilers has been increased and special inside baffles have been provided at the steam outlet. Elimination of the dome reduces the over-all weight of the boiler and saves on insulating and housing expense. Other changes of design include considerably enlarged fire box. This increases the rate of evaporation of the water, by enlarging the most efficient heating surface of the boiler. Larger fire box contributes also to improvement of the efficiency of combustion.

Fuel

Field tests indicate that in a gas-fired boiler, not using any fuel-saving devices, the gas requirements for over-all drilling operations are from 50 to 75 cu. ft. per rated boiler-horsepower-hour. Thus a five-boiler battery of 150-hp. boilers would require from 900 to 1,450 M.c.f. of gas per day. This is an average demand. During the periods of peak demand the steam requirements may be considerably higher. The capacity of gas-supply lines should be calculated for the peak of demand.

Value of insulation in saving of fuel cost is well known. There has been considerable improvement in equipment providing insulation for rig drilling boilers compared with insulating jackets which were used in the past and which were easily damaged in moving and required considerable time for installation. Nevertheless, in many areas the practice of insulating the drilling boilers is still not generally accepted.

Firing Controls

A contribution toward fuel economy and toward decreasing the maintenance cost of boilers are the firing controls which automatically maintain constant the desired steam pressure. These controls are pretty nearly a standard on modern drilling rigs.

One of the types of such controls consists of fuel and stack-blower regulators, unitized with all necessary valves, bypasses, gages and piping, and skid mounted. The fuel regulator has two functions. It controls the steam pressure and it compensates for changes in gas-supply pressure. When the steam pressure tends to decline a pilot valve increases the gas pressure on top of the master diaphragm controlling the gas-supply valve. The downstream gas pressure is admitted to the under side of the diaphragm and the pressures on both sides of the diaphragm are balanced by positioning of the main valve plug. This balance is automatically maintained thus compensating for the gas-supply pressure changes. The stack blower regulator, actuated by burner pressure, controls the steam flow to stack blowers maintaining the needed draft conditions.

Feed Water

In normal drilling operations from 2 to 2.5 bbl. of feed water are needed per boiler-horsepower-day. Thus a battery of five 150-hp. boilers has water requirements of from 1,500 to around 1,900 bbl. of water per day.

Preheating of feed water is now a generally accepted practice. Fuel savings are generally calculated as around 1 per cent for each 12° of temperature increase. This would represent a fuel saving of around 10 per cent for the usual range of temperature increase through preheating. Fuel savings, however, are only one of the benefits secured from feed-water preheating. Even more important are those which contribute toward more satisfactory operation of the boiler and which increase its useful life.

Preheating diminishes temperature strains inevitable in case of feeding cold water into the boiler. Time needed for conversion of water to steam is reduced. An appreciable amount of scale-forming materials is precipitated in the preheater, from where it may be removed easily. Very substantial amounts of mud, sand, silt, and free solids settle out in the preheater. In open types free oxygen is liberated from the water before it enters the boiler, thus reducing corrosive action.

Several types of preheaters are available commercially. A predominant method of heat transfer used is direct contact of steam with a spray of water. Exhaust steam from engine or boiler feed-water pumps is used as operating medium. The preheaters are built as separate self-contained units, skid-mounted, and easily movable.

When needed, chemical treatment of water is a standard practice and is usually performed by special service companies, which furnish inspection service with the product they sell.

To handle satisfactorily large volumes of water required by modern boilers, size of feed-water pumps used had to be increased. Pumps of this type are now available, and are used, in sizes 10 by 5 by 10 and 10 by 6¼ by 10. Construction is such that they may be operated on both the saturated and the superheated steam. The smaller of the two pumps is designed for steam pressure of 350 lb. and water pressure of 1,000 lb., and the larger, for steam pressure of 500 lb. and water pressure of 1,500 lb.

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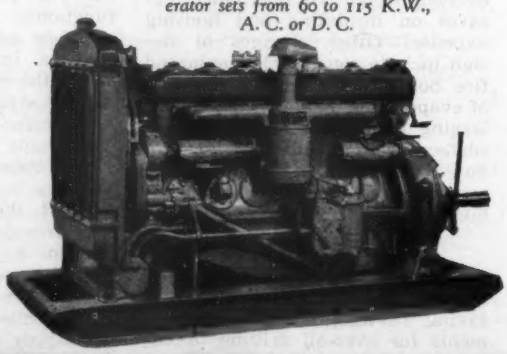

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Methods of Measuring pH, Automatic Control, Maintenance

This the last of four articles covering both the theoretical and practical aspects of pH (hydrogen ion tests). Previous articles have appeared in the issues of August 16, 23, and 30, under the subjects "Measurement and Control of pH," "Relationship Between pH and Hydrogen Ion Concentration," and "Methods of Measuring pH."

4. The antimony electrode.—The antimony electrode is typical of the several metal-metal oxide electrodes which have been used for pH measurement. For successful operation of such electrodes it is essential that the solution be saturated with a slightly soluble oxide of the metal. This requirement limits general applicability of the antimony electrode, for it necessitates stirring and the absence of chemical substances which react with the oxide. The electrode cannot be used in the presence of oxidizing agents such as permanganate or dichromate, nor in the presence of organic compounds which form complexes with the antimonous oxide.

Although the antimony electrode has been the subject of many investigations, the various investigators do not agree upon the relationship between e.m.f. and pH. Because of this discordance, authorities state that although the antimony electrode is useful for potentiometric titrations, it is not suitable for accurate pH measurements.

5. The glass electrode.—The glass electrode usually consists of a thin-walled glass bulb, made of a special glass. On the inside of the bulb a suitable electrolyte and electrode are placed. It is found that such electrodes permit very accurate measurements of PH over the range 0 to 9.0, regardless of the presence of oxidizing or reducing agents, colloidal matter, suspended solids, etc., and permit measurements to be made in slightly buffered solutions as readily as in well buffered ones. The same is true in the pH range above 9.0, except that as the alkalinity is increased high sodium ion concentrations cause deviations for which a correction must be made. Other alkali metals cause similar but much smaller deviations.

To minimize this error, known as the sodium ion error, a special glass electrode has been developed by National Technical Laboratories, employing a glass membrane of special composition. When this Beckman type E electrode is used, the customary sodium ion error with standard electrodes is greatly reduced and for most practical purposes can be neglected.

Because of its wide pH range and its inertness toward chemical reaction with constituents of solutions, the glass electrode is the most generally used type. Its preparation for use is simple and does not require repetition for each pH measurement. No foreign substance is added to the test sample. Equilibrium between electrode and test sample is immediately established. Furthermore, the glass electrode may be constructed for measuring pH of very small samples or for determinations on semisolids and plastic materials.

It will have been noticed that many of the limitations mentioned in connection with various methods of determining pH, such as the colorimetric method, the hydrogen electrode, the quinhydrone electrode, and the antimony electrode, are such that these methods are impractical for general use in industry. Certain of them are adaptable to specific applications, but cannot be used for other equally important and frequent applications. Each of these methods is limited either in range of pH values to which it may be applied, types of solutions to which it may be applied, accuracy, or reproducibility of results, or several of these factors. It is thus concluded that the glass-electrode method of measuring pH is the logical first choice for general applications.

The voltage developed when the electrodes, e.g., glass and calomel, are immersed in a solution will depend on the pH of the solution. It is possible to measure this voltage, and hence the pH, in various ways. Some limitations exist, however. It must be measured by a device sensitive to small voltage (a few millivolts), one which does not draw any appreciable current from the electrodes (current passage through the electrodes causes them to polarize, upsetting the conditions), and one which is protected from interference by outside electrostatic effects. (The low-voltage, low-current, high-resistance nature of the glass-electrode circuit makes it very susceptible to outside current leakages unless carefully shielded.) In addition, there are of course the obvious requirements and convenience, accuracy, and reliability.

Temperature is another one of the variables in pH measurement which must be compensated for in pH meters. We refer again to our previous statement, that pure water at 22° C. has a pH of 7.

The industrial type pH meter, which is usually provided for continuous applications, compensates for temperature changes by a resistance thermometer. The thermometer is sealed in a glass tube and installed alongside the electrodes. It automatically adjusts the e.m.f./pH relationship of the instrument in accordance with the temperature coefficients of the electrodes. No moving parts are required and compensation extends over the full range of 0°-100° C.

Automatic pH Control

In the application of automatic pH control, certain factors, irrespective of the equipment selected, must be considered before satis-

Contributed by Southern California Meter Association. Author: N. E. Swanson, Los Angeles, The Foxboro Co.

factory results can be obtained. The three most important are speed of reaction, agitation and time lags.

1. Speed of reaction.—For all general purposes, the speed of reaction of an automatic pH control process can be considered instantaneous. Refer to W. N. Greer and A. L. Chaplin's paper, "Some Factors Affecting Automatic pH Control." The importance of this factor is obvious in that it tells us that any change in reagent demand, whether caused by change in rate of flow of influent, its acidity (or alkalinity) or by quantity or reagent, is immediately reflected by a change in the pH of the process. There are exceptions to this condition, but for the purpose of this paper, we will assume that the speed of reaction is instantaneous.

2. Agitation.—The importance of good agitation in the controlled process cannot be overemphasized. It is obvious that good reaction, etc., cannot be obtained without thorough mixing of the reagent and the process material. Any measurement which does not reflect the true condition of the treated material will obviously result in poor control.

3. Time lags.—Much has been written on the importance of time lags. Fortunately, in pH measurement the time lags are of a lesser magnitude than encountered in most temperature applications.

On applications for which only a record of the pH is desired, time lags are of little importance; however, when automatic pH control is being considered, they become of the utmost importance and careful consideration must be given to the location of the electrodes and also to determine that adequate agitation is provided in the mixing tank. Generally speaking, the most satisfactory results have been obtained where it has been possible to immerse the electrodes directly in the mixing tank. This eliminates the time lags frequently in the continuous sample method.

4. Retention factor.—In setting up equipment for automatic pH control, careful consideration must be given to the selection of the mixing tank. It must have sufficient capacity to provide a retention factor capable of producing stable control.

It is possible, through mathematical calculation, to determine the rate at which the pH in the tank will change for a given change in influent and reagent strength. From these data it is then possible to calculate the trottling and reset settings which will be required on a pH controller in order to obtain good control.

Out of these studies there have come certain rules which must be followed in the application of automatic pH control, if satisfactory results are to be obtained. If we group all the factors which add together to produce the time lag of the control system; namely speed of reaction, agitation, and speed of response of the control equipment, it may be defined as the time interval in minutes between a change in reagent feed and initial response of the control instrument. For our purpose we will define this interval as "t."

The size of the mixing or reaction tank is a function of two things. It must be of sufficient size to provide the required retention factor and it must not be greater than can be satisfactorily agitated. Keeping in mind that we wish to hold the retention factor or "r," as we shall term it, small, in order to provide good agitation at a minimum on control application. Through experimentations and calculations it has been established that time lag is generally between 0.1 and 1 minute. Again, through experiment, it has been established that for optimum control the retention factor should be approximately 10 times the time lag. For example, if we had a process in which the influent was approximately 50 g.p.m., well agitated and with the electrodes directly in the tank, time lag, which for this example we will take at a poor condition, will be 1 minute. Therefore $r = t \times 10$ or our retention time requirement is 10 minutes. The mixing tank, under these conditions, then should have a capacity of approximately 500 gal. With an installation of this type it is possible to have a considerable variation in influent and reagent strength and still maintain pH of plus or minus 0.1 pH.

Maintenance

More maintenance and testing are required for pH equipment than any other type of industrial instrument, such as those for temperature, pressure, flow, etc. An inspection of the electrodes reveals their delicate construction as compared to a thermocouple, or orifice plate.

Some aspects of maintenance, such as the conventional slide wire type of recorder controller and motor valve, are familiar. The Dynalog type eliminates all periodic maintenance except the yearly replacement of vacuum tubes. All tubes are used at far below rated capacity, giving long life. No batteries are used and there are no moving contacts or sliding parts. Since the control mechanism is identical to that used in other types of instruments, such as temperature, flow, etc., maintenance of the control mechanism is greatly simplified.

The amplifier and electrode system are different, and consequently some times considered more difficult; however, adequate recognition of the different and special features of pH equipment will do a lot to reduce this maintenance.

The Beckman amplifier is very rugged in its construction. The three important things on the amplifier are: (1) It must be well grounded so that stray potentials do not upset its equilibrium; (2) It must be free from moisture; (3) It cannot be located where it will be subject to severe vibration. Vibration in this instrument, as well as all other electronic devices, tends to shift the grid positions and thus change the tube characteristics.

By far the greatest maintenance on pH equipment is in the electrode head—below 3.5 pH the life of the stainless steel head is limited, due to corrosion. The presence of even small traces of moisture in the head causes serious trouble that can only be corrected by removing the head and drying all affected parts. However, here again by giving the proper recognition to the various problems encountered in maintaining the electrode assembly, it becomes possible to have reliable pH control without undue maintenance costs.

In the presentation of this material the writer wishes to acknowledge the work of R. Moulton of National Technical Laboratories, who assisted in the preparation of this report.

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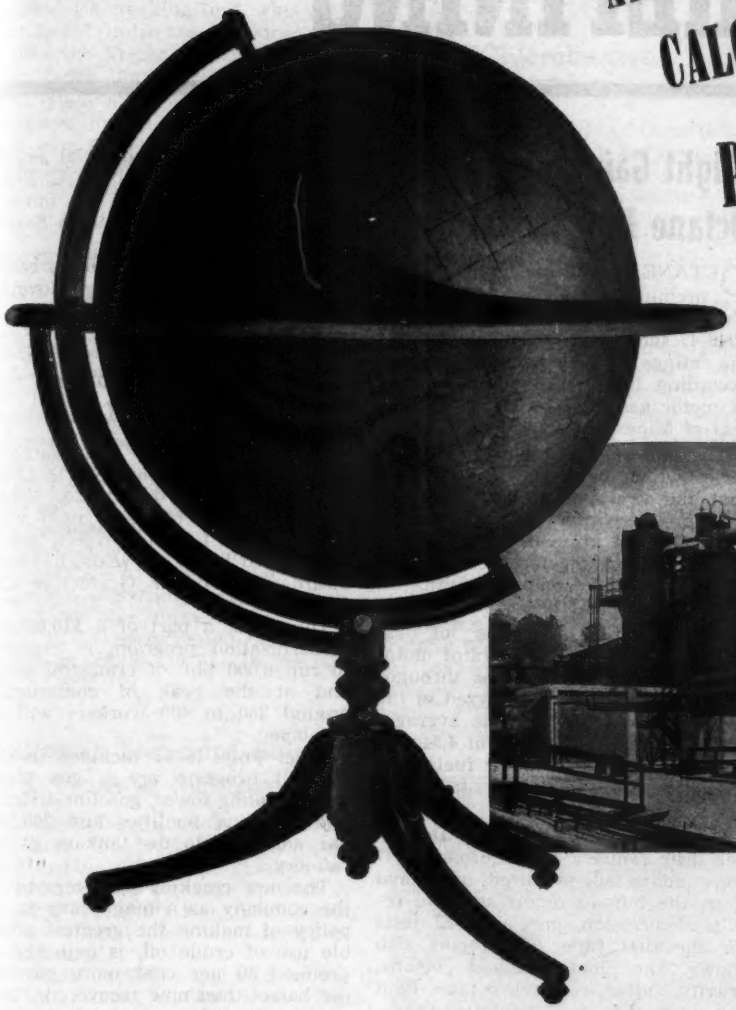

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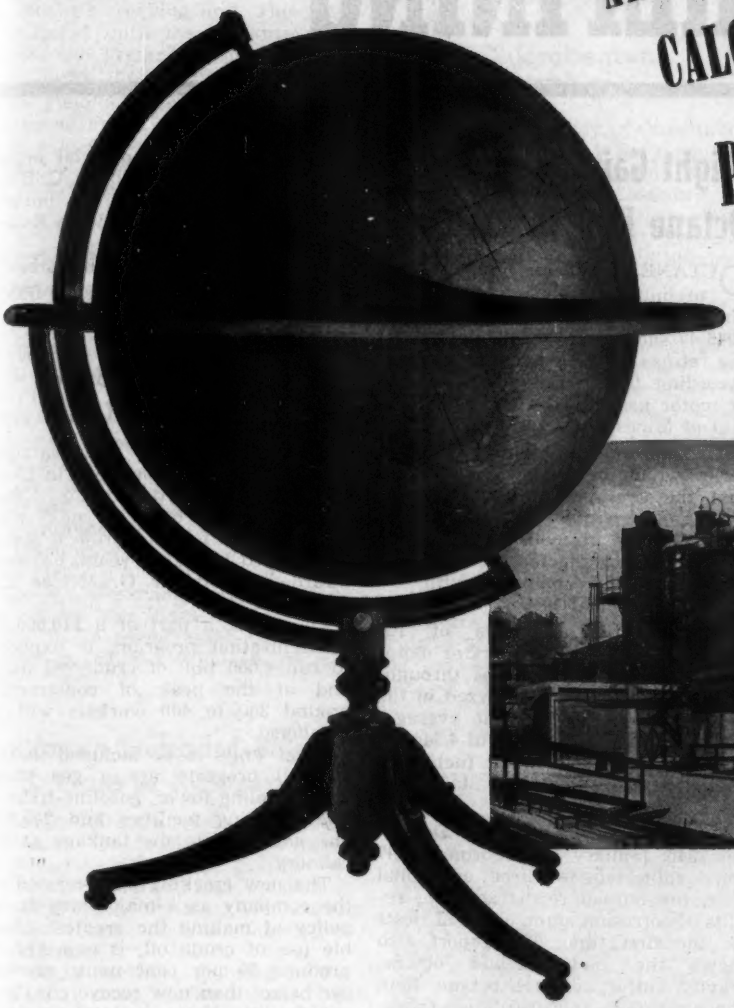

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Slight Gain Shown in Octane Last Winter

OCTANE ratings of regular and premium gasolines sold in the United States during the winter of 1946-47 showed an improvement over the ratings of the preceding summer, according to the semiannual survey of motor gasolines by the U. S. Bureal of Mines.

The survey, the twenty-first in a series which began in 1936, showed that the average octane of regular gasoline last winter was 75, compared with 74.4 the previous summer, and the average octane for premium last winter was 78.5, compared with 78.3 for the summer of 1946.

Service-station products of 124 major and minor marketers of motor fuel in 21 marketing areas throughout the country were analyzed in the 1946-47 winter survey. The averages are based on the analyses of 4,544 individual samples of motor fuels purchased in 282 cities in 40 states and the District of Columbia.

Gasolines collected during December 1946, January and February 1947 were subjected to three additional tests, the bureau report showing results of corrosion, gum, and TEL tests for the first time. The report also shows the motor-method octane, gravity, sulfur, research octane, Reid vapor pressure, and distillation range.

As in previous surveys, the report was compiled by the bureau in cooperation with the coordinating fuel research committee of the Coordinating Research Council, Inc. Material contributed by 20 industrial organizations was assembled by O. C. Blade, petroleum chemist of the bureau's Bartlesville, Okla., Petroleum Experiment Station.

A summary, by marketing areas, of average octane ratings is shown in the accompanying table.

	Premium		Regular	
District—	Summer 1946	Winter 1946-47	Summer 1946	Winter 1946-47
Boston	78.6	78.6	75.9	76.5
New York	78.9	78.6	76.6	76.4
Washington	78.7	78.5	75.8	76.1
Pittsburgh	78.3	78.6	75.4	76.3
Cleveland	78.2	78.4	75.1	75.8
Detroit	78.0	78.3	74.1	74.6
Atlanta	79.5	78.8	75.4	76.6
Memphis	78.3	78.6	75.4	76.2
Chicago	78.1	78.4	73.5	74.0
New Orleans	78.3	79.0	75.8	76.1
St. Louis	78.4	78.4	74.0	74.4
Minneapolis	78.0	78.0	73.0	73.0
Omaha	77.3	78.1	73.0	73.8
Tulsa	77.7	78.0	72.9	73.5
Texas	78.8	78.6	74.4	75.4
South Rocky Mtn.	77.7	76.7	73.7	73.0
Mid. Rocky Mtn.	77.7	77.6	72.1	72.1
North Rocky Mtn.	77.3	77.8	71.9	73.5
Seattle	79.2	80.2	75.4	75.6
Los Angeles	78.6	79.8	74.3	75.1
San Francisco	78.3	79.9	74.9	75.6
National avg.	78.3	78.5	74.4	75.0

Ohio Standard to Build Cracking Unit at Lima

Construction of a new catalytic cracking unit and gas plant in Lima, Ohio, by Standard Oil Co. (Ohio) will be started by early next year. The contract for the project, which is expected to take 2 years, has been awarded to Arthur G. McKee Co., Cleveland.

The plant, a part of a $10,000,000 modernization program, is expected to run 6,000 bbl. of crude oil daily, and at the peak of construction around 300 to 400 workers will be employed.

Other units to be included in this over-all program are a gas plant, water-cooling tower, gasoline-treating and blending facilities and 200,000-gal. additions to the tankage at the refinery.

The new cracking unit, termed by the company as a major step in its policy of making the greatest possible use of crude oil, is expected to produce 30 per cent more gasoline per barrel than now recovered. Present facilities have a total capacity of 12,000 bbl. of crude oil daily and 6,900 bbl. daily cracking.

The balance of this year will be required to complete building plans.

Materials Delay Slows Frontier Conversion Work

Completion of the conversion project of the former government refinery at Cheyenne, Wyo., by Frontier Refining Co., originally scheduled for July 15, has been slowed down due to delays in delivery of materials.

In order to complete the new thermal unit by August 15 certain substitutions of material have been made in the piping system, and construction crews have substantially increased their work hours.

A new steam line connecting the two refinery units is now in operation which permits a shutdown of the boilerhouse at Frontier's original refinery. This was a purchase condition by the Government for eco-

nomical operation when the plant was bought by Frontier June 1.

The new acid blowdown pit has been completed but not tied in with the catalytic cracking unit. This will be deferred until the cracking unit finishes the present record run and comes down for turnaround.

The yield and quality of gasoline is expeced to increase, together with lower over-all manufacturing costs as a result of this $213,000 improvement and expansion program.

Texas Refinery Storage Total Gains in July

Texas refinery storage increased 1,008,274 bbl. during July to reach a total of 66,942,560 bbl. at the month's end, it has been reported by the Texas Railroad Commission.

Crude-oil stocks decreased from 18,772,312 to 17,927,772 bbl. while gasoline decreased from 13,329,591 to 12,032,031 bbl. Kerosine and distillates increased from 12,944,111 to 15,-101,409 bbl. while fuel oil increased from 9,008,496 to 10,186,914 bbl.

The above-ground storage, including oil in pipe lines and on tank farms, in Texas increased from 133,-734,046 to 144,197,556 bbl. in the last year.

California Standard Buys U. S. Plant in Richmond

Standard Oil Co. of California has purchased for $6,000,000 a Government-surplus, 100-octane gasoline refinery in Richmond, Calif., which it operated during the war,, War Assets Administration has announced in Washington.

Principal facilities included in the sale—all located on land owned by Standard Oil Co., but leased during the war by the Government—are: 19 buildings, two Thermofor catalytic cracking units with a separate gas-recovery unit for each; one HF-alkylation unit, one isomerization unit and a butane-pentane distillation unit, together with necessary utilities and auxiliaries. Each of the cracking units has a designed capacity of 14,500 bbl. per day, but because of improvements can attain 20,000 bbl. per day. The entire plant has a reported cost to the Government of $21,215,000.

Coal Company Contracts For Fuel Synthesis Plant

A $500,000 contract for the construction of a coal gasification pilot plant for Pittsburgh Consolidation Coal Co. has been awarded to the Blaw-Knox Co. The new plant will be located at Library, Pa., near the coal company's research center.

The purpose of the new plant is to determine a practical process for the commercial production of synthesis gas which is the first step in producing synthetic fuel from coal.

Phenol Chlorobenzene Studied in OTS Report

A comparative study of three processes used in Germany for manufacturing synthetic phenol and a description of the manufacture of chlorobenzene at I. G. Farben plants are contained in a report available from the Office of Technical Services, Department of Commerce.

The report was prepared by Robert H. Krimble and Joseph B. Holmes, General Electric Co. chemical engineers, and Benton H. Wilcoxen, consulting chemical engineer. It is in five parts, three cover phenol manufacturing processes and two, chlorobenzene manufacturing.

Iron-Valve Recommendation

Copies of Simplified Practice Recommendation, Iron Valves, which applies to the usual types of iron gate, globe, angle, and check valves for primary pressures of 25, 125, 150, and 250 psi. and 100 and 800-psi. pressures of water, oil, and gas, are now available, it has been reported by the National Bureau of Standards.

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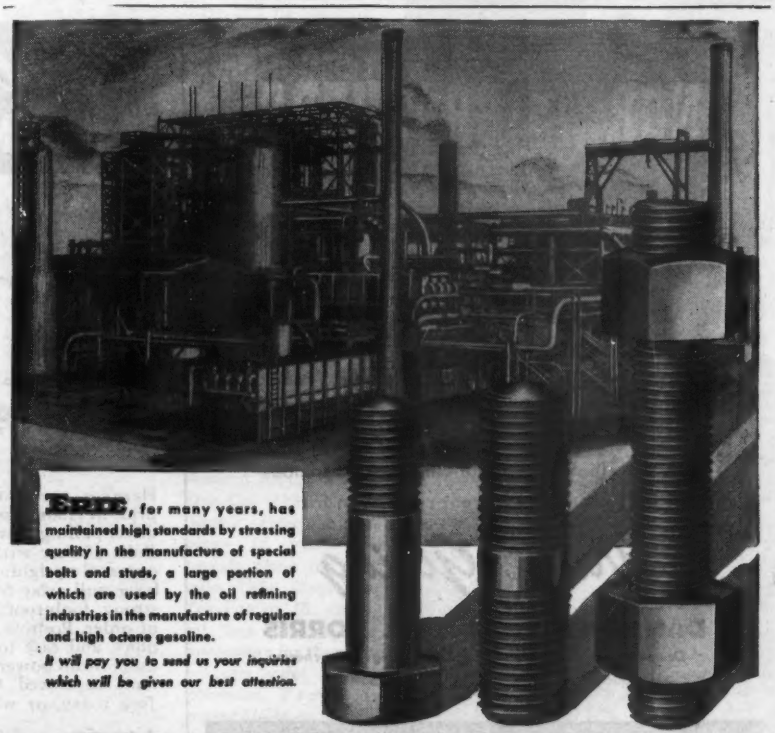
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1- New Murphy Diesel engine Model ME-46, 6" bore x 6½" stroke, enclosed type, 100 Hp @ 1200 RPM with radiator, steel skids, enclosed Twin Disc power takeoff clutch and with spare injector.

1- New Waukesha engine Model 6NKU, 7" bore x 8½" stroke, 6 cylinders, 226 Hp @ 950 RPM, with air cleaner, box type base, combinations gas-gasoline carburetor, radiator, thermostat, temperature gauge, oil filter, heavy duty magneto, water cooled exhaust manifold, radiator guard, safety switches, friction type throttle, ring gear Twin Disc x 7189B clutch power takeoff and Waukesha Model ICKU starting unit.

1- New Murphy Diesel engine Model ME-66, 6" bore x 6½" stroke 150 Hp @ 1200 RPM, enclosed, with radiator, steel skids, air precleaner, enclosed Twin Disc power take-off clutch and spare injector.

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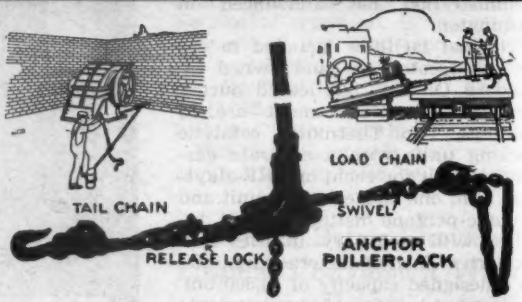

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PIPE LINES

Socony-Vacuum to Build Portland-Bangor Line

WITH completion of a new 127-mile pipe line by Socony-Vacuum Oil Co., Inc., scheduled for late next year or early 1949, steady supplies of petroleum products will be assured for a large portion of Maine, according to an announcment by company officials.

The pipe line will replace barges in the transportation of gasoline, kerosine, and fuel oil from the company's marine terminal at South Portland.

This means, the officials said, that transportation of the products through the line can be carried on continuously throughout the year. By comparison, severely inclement weather impedes and sometimes halts barge transportation for several weeks each winter.

The new line and supplementary facilities, including a "bleeder" plant on a four-acre site at Auburn, will cost close to $1,000,000. The "bleeder" plant will draw off supplies from a spur from the main line and store them for subsequent distribution by trucks.

Originating at the Socony-Vacuum tanker terminal in South Portland, the line will be of 6 in. in diameter for 61 miles to Hallowell, near Augusta, and 4 in. in diameter for 66 miles from Hallowell to Bangor. It will serve Lewiston also and have a potential capacity of about 12,000 bbl. per day.

All of the barge lines currently serving points to be traversed by the line originate at South Portland and use the Penobscot River to Bangor, the Kennebec to Hallowell, and the Androscoggin to Lewiston. Most of the supplies for the South Portland terminal arrive by large tankers from refineries in Texas.

Socony-Vacuum announced that actual construction of the pipe line is scheduled to start as soon as weather conditions permit next year.

Wyco Makes Progress; Experiencing No Delay

Continuous good progress is reported by Stanolind Pipe Line Co. in laying Wyco Pipe Line Co.'s 268-mile, 8-in. gasoline line from Casper, Wyo., to Denver. According to recent reports, 19 miles of pipe was laid in the week ending August 29, making a total of 194 miles laid up to that date.

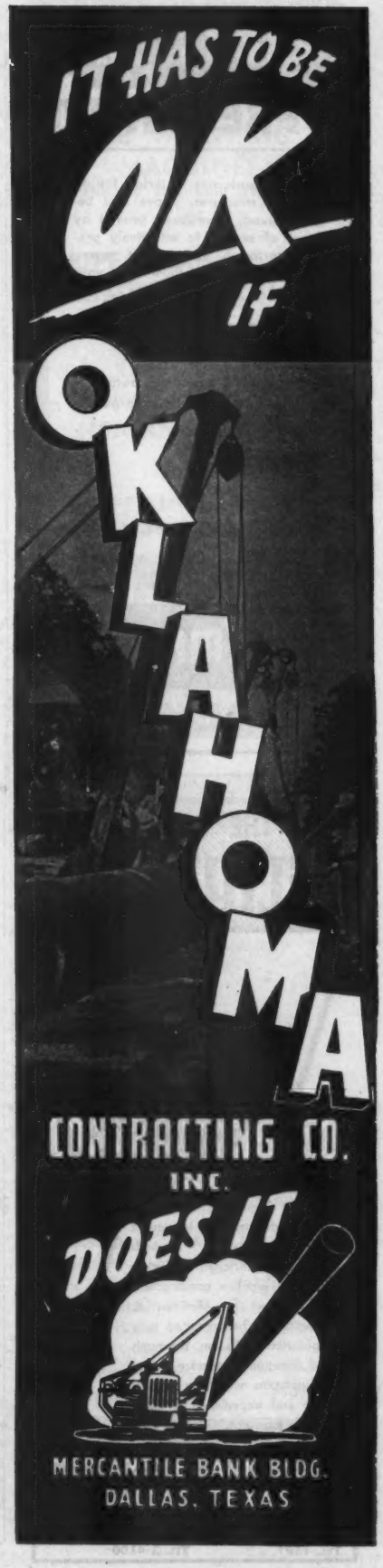
The two spreads working on the line are averaging 1½ miles of pipe per day.

This is one of the few pipe line projects under construction which has experienced no delays in waiting for pipe and other materials since all supplies required were on hand in the field when construction began.

Basin Pipe Line System Organized Like Bayou

For handling the construction and operation of the system planned by Texas Pipe Line Co., Shell Pipe Line Corp., Sinclair Refining Co. and Empire Pipe Line Co., for a line from Jal, N. M., via Midland and Wichita Falls, Tex., to Cushing, Okla., to be built of 20, 22, and 24-in. pipe, a plan

J. E. McGeath, assistant general superintendent, Magnolia Pipe Line Co., with the company's Fairchild airplane in which he travels along the 647-mile, 20-in. Corsicana, Tex.-Patoka, Ill., crude-oil line. Construction operations for the project are under his supervision. From his present field headquarters in North Little Rock, Ark., he can readily reach all phases of the work by airplane and automobile



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of organization has been worked out for this project which is now known as the Basin Pipe Line system.

The method for collaborating in this undertaking closely follows the procedure for organizing the Bayou Pipe Line system started during the war for transporting products from Texas Gulf Coast refineries to the Plantation Pipe Line Co. terminal at Baton Rouge.

In 1942 Shell Pipe Line Corp. bought the Basin Pipe Line Co. which had a line between Wasson and Big Spring, Tex.; the line was added to the Shell properties; and the former Basin company is now defunct. In the Shell organization, at the present time, the name "Basin" only applies now to the Basin Pipe Line System.

Sinclair System Links East Chicago, Marcus Hook

Sinclair Refining Co. has announced completion of products pipe line connecting the company's refineries at East Chicago, Ind., and Marcus Hook, Pa.

The line, originally built in the east from the Marcus Hook refinery to Steubenville, Ohio, with an extension to Washington and Baltimore, and in the west from the East Chicago refinery to Toledo, Ohio, has been extended northward to Detroit, southward to Columbus and eastward from Marion to Akron and Youngstown. The line now completed from Youngstown to Steubenville links together the entire system. Between Steubenville and Toledo the line is equipped to pump products east or west, enabling the company to meet extraordinary demands anywhere within the area served.

With the completion of this line the company is now in a position to serve the area from the Atlantic Coast to Chicago from its East Chicago refinery in the Middle West or its Marcus Hook refinery on the Atlantic Seaboard. In addition, the company now has under construction an extension of the line from Akron to Cleveland.

Sunray to Start Soon On Allen-Beckett Line

Sunray Oil Corp. awarded contracts to Pipe Line Service Co., Seminole, Okla., for construction of the 93-mile 6-in. line to connect the company's refineries at Allen and Beckett, Okla. Pipe-laying operations are expected to be under way September 15. The line is scheduled for completion in 90 days.

This line will be operated in an unusual way as a plant facility for the interchange of material in two directions. According to present plans, the line will pump 36°-gravity charging stock from Allen to Beckett, during one month; while the next month

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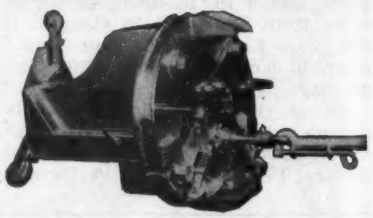

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it will be pumping finished products in a reverse direction from Beckett to Allen.

The line will have three pump stations operating at 1,100-psi. discharge pressure for handling a throughput of 20,000 bbl. daily. Each station will be equipped with a 550-hp. diesel engine driving an eight-stage centrifugal pump.

Sinclair's South Texas System Half Completed

Sinclair Refining Co.'s 8-in. products pipe line from Corpus Christi to Austin, a distance of 185 miles, is now half completed. A new 6-in. pipe line, from San Antonio to Luling, 50 miles in length, will connect with the Corpus Christi-Austin line. Work on the 6-in. project is not yet under way but pipe is on the ground.

Shell Operates Sheridan-Deer Park Products Line

Shell Pipe Line Corp. has completed and put in operation a 100-mile, 6-in. products line which connects the Shell Oil Co., Inc., gasoline plant at the recycling project in Sheridan field, Colorado County, and its Houston refinery at Deer Park, Tex.

The line has a capacity of 8,700 bbl. daily and will initially handle butane, isobutane, natural gasoline, and distillate. Shipments of propane have not yet started. Average batches are planned for 3,000 to 4,000 bbl. though some may be as small as 1,000 bbl. The line is being operated as a common carrier.

California Co. Building Quealy Dome, Wyo., Line

California Co. has started preliminary work in the field for laying of a 24-mile, 6-in. crude-oil line from Quealy Dome to Rock River, Wyo. The line is to be completed at the end of September to connect with the system of Utah Oil Refining Co. at Rock River. The new line will loop the California Co.'s existing 4-in. line, and will provide an outlet for production developed this year in the Tensleep sand.

Northern Natural Lays Cimarron River Crossing

Northern Natural Gas Co. is laying a river crossing across the Cimarron River near Liberal, Kans.

The contractor, R. H. Fulton Construction Co., is employing the Moore-trench well-point method of dewatering. Pipe is laid in a 3,500-ft. trench 20 ft. below the river bed. Cuts in the bank of the river are as deep as 35 ft.

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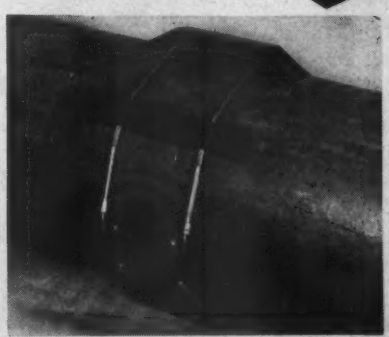
The New Williamson PIPE LINE CASING INSULATOR*



Williamson Pipe Line Casing Insulators are clamped around coated pipe 20 to 30 ft. apart before installing in right-of-way casing. Insulating blocks—hard and rugged—serve as skids, protecting pipe coating and insulating pipe from casing. Essential for cathodic protection.

*Patent Pending Refer to Dept. J

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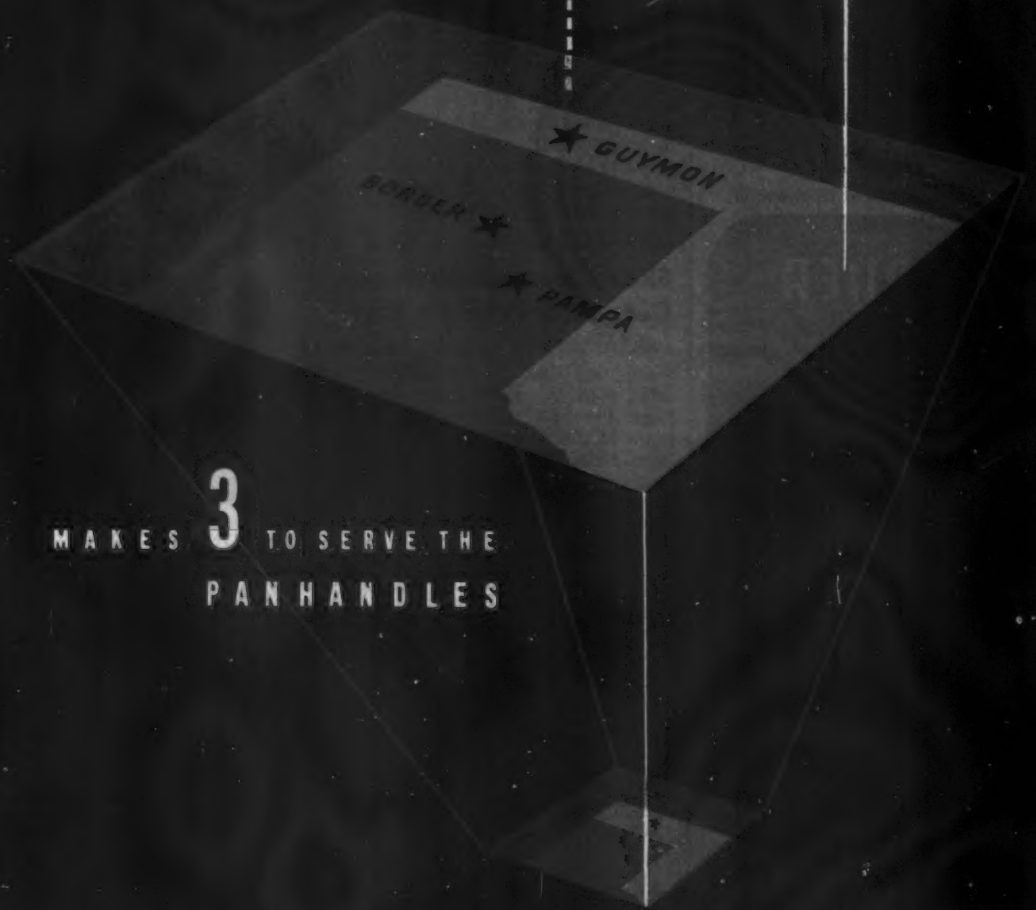

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NATURAL GAS

Gas Sales, Revenue Show Continued Increase

WASHINGTON. — Operating revenues of natural-gas companies reporting to the Federal Power Commission amounted to $44,681,481 in June 1947, an increase of 11.1 per cent over the $40,217,076 reported for the same month a year ago.

Gas sales to ultimate customers in June 1947 were up 13.1 per cent over June 1946. Revenues from such sales increased 14.8 per cent and amounted to $22,748,812. Sales to residential consumers increased 9.5 per cent while those to commercial and industrial consumers increased 14.8 per cent and 12.4 per cent, respectively. Revenues from these three groups were: residential, $9,230,665; commercial, $1,713,544; and industrial, $11,326,202, up 9.8 per cent, 16.1 per cent, and 19.0 per cent, respectively.

FPC Order Asked to Get Gas Supply From Big Inch

WASHINGTON.—The Indiana Gas & Water Co., Inc., has asked the Federal Power Commission for an order directing Texas Eastern Transmission Corp. to establish a physical connection of the Big Inch lines near Millhousen, Ind., with facilities of the Indiana company and to sell natural gas to the latter at the point of interconnection.

The Indiana company proposes to use the gas for serving approximately 2,150 consumers in and adjacent to Greensburg, Ind. The supply from the Inch lines, the Indiana company said, would be substituted for reliance upon Greensburg gas field as the principal source of gas supply for Greensburg.

Mississippi River Fuel Plan To Be Heard September 15

WASHINGTON.—The Federal Power Commission has set a hearing September 15, in St. Louis, on a request of Mississippi River Fuel Corp. for authorization to construct and operate facilities to increase delivery capacity of its system by 83,000,000 cu. ft. per day.

Construction proposed consists of a series of loop lines to provide two separate continuous pipe lines from the Perryville compressor station in Louisiana to St. Louis and installation of an aggregate of 11,000 additional horsepower at the Perryville, West Point, and Twelve Mile stations. The looping would include about 189 miles of 22-in., 23 miles of 12-in. in 4-line manifolds at creek crossings and 18½ miles of 10-in. line in 6-line manifolds at river crossings. Cost has been estimated at $11,083,715. After installation of the facilities is completed, the company's total daily capacity would be 275,000,000 cu. ft. of gas at the Perryville station.

Hearing Due September 10 On Panhandle Connections

WASHINGTON.—The Federal Power Commission has set a hearing September 10 in Indianapolis upon applications filed by three Indiana gas companies requesting the commission to require Panhandle Eastern Pipe Line Co. to furnish the companies' requirements of natural gas and to require other companies to transport the gas.

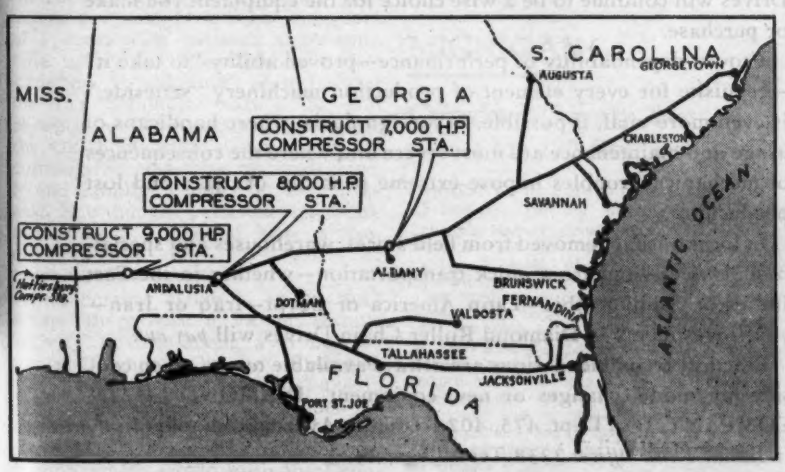
Companies filing the applications were Eastern Indiana Gas Co., Summit Gas & Water Co., Inc., and Kingstown Natural Gas Co.

Appliance Sales Point to Increasing Gas Demand

The widespread increase in the demand for natural gas on the part of the public is illustrated by sales of the gas-utility companies and appliance dealers as a recently completed survey by the bureau of statistics of the American Gas Association shows.

Manufacturers shipped 1,166,000 gas ranges in the first 6 months of 1947 and are predicting that by the end of 1949 a total of about 7,000,000 gas ranges will have been sold. The same study brought out that the utility companies expect that a total of 3,257,000 automatic gas water heaters, 599,100 manually-operated water heaters, 1,875,600 gas house heating units, and 1,464,000 gas refrigerators will be sold during the 3-year period.

PROPOSED NEW SOUTHEASTERN GAS SYSTEM



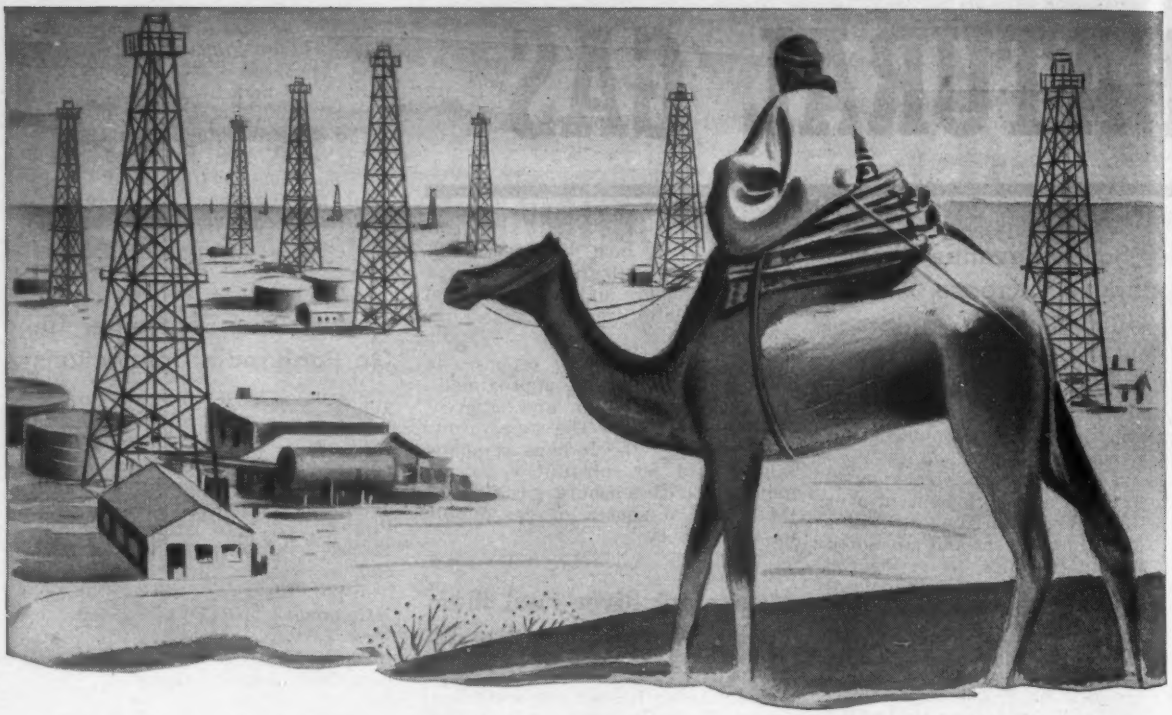
Proposed new pipe-line system of Atlantic Gulf Gas Co., recently formed subsidiary of United Gas Corp., is shown on the above map. Application for authority to construct the $57,000,000 project is now pending before the Federal Power Commission. The new system will include 1,530 miles of pipe lines in size up to a diameter of 26 in., extending from near Hattiesburg, Miss., to eastern terminals near Georgetown, S. C., and Jacksonville, Fla. It would include one 9,000-hp. compressor station, to be located near Andalusia, Ala., with an estimated annual capacity of 67 billion cubic feet. The system would purchase natural gas from United

Natural Gasoline

Report Shows July Output At 4,472,774 Gal. Daily

Daily average production of natural gasoline in the Mid-Continent and Gulf Coast areas during July was 4,472,774 gal., according to the monthly report of the Natural Gasoline Association of America.

The daily average, converted to the equivalent of the 26-70 grade, was 5,245,749 gal. For the entire month, production of 26-70 was 48,144,533 gal., about 30 per cent of the total production of all grades, the report said.



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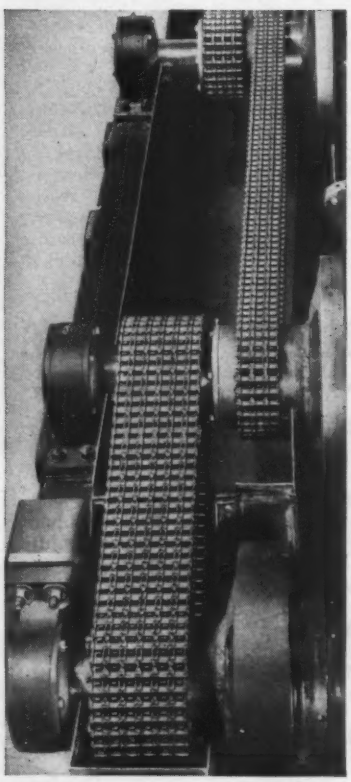

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Exploration and Drilling

Filling in the Gaps

COMPLETION of Deep Rock Oil Corp. 1 Black, SE SE NW 17-10n-2w, Pottawatomie County, Oklahoma, between Shawnee and Oklahoma City, for a 50-bbl.-an-hour discovery in the Wilcox sand (Simpson) at around 6,000 ft. is typical of one of the many phases that, combined, account for the tremendous increase in Oklahoma drilling activity this year.

There is more than one set of conditions responsible for the 50 per cent plus increase in total completions thus far, and the 80 per cent plus increase in wildcat completions for 1947 over 1946 in the state. The Deep Rock strike, however, is typical of the campaign to fill the gaps between producing areas, where those gaps exist because of breaks in the regional geology.

The new strike lies in that so-called "indiscriminate area" between the Seminole uplift, a major regional feature, and the south end of the Nemaha granite ridge terminating in the Oklahoma City structure. As the Seminole development proceeded, some geologists began to suspect that the conformation of some of the producing pools might indicate some sort of a connection between the Seminole uplift and the Oklahoma City structure. It just didn't seem natural for the Seminole feature to end abruptly on the northwest and for the Oklahoma City structure, as the culmination of a long regional ridge, to end equally abruptly on the southeast. The thought persisted that there might be a transition zone across, either a low ridge, or a series of bumps in between.

The current strike is in an area where there was a lot of seismic activity in 1943 along a trend between Oklahoma City and Shawnee, after the strike at Shawnee Lake in 1943. This seismic work tended to confirm the long-held suspicion that there was a series of relatively low bumps, which would push the Ordovician up enough to make it productive.

In this particular instance, the acreage was badly split up originally, and it was difficult to work out any kind of a deal whereby one particular company could afford to make a test. After considerable negotiation, Deep Rock, which made a play early, prior to seismic confirmation, finally managed to work up farmout deals involving at least three major companies. These arrangements permitted Deep Rock to accumulate about 1,100 acres net out of 1,600 gross acres in a block. Among the companies with varying interests, acreage or overrides, or acreage in the vicinity, are Amerada Petroleum Corp., Stanolind Oil & Gas Co., Atlantic Refining Co., The Texas Co., Mid-Continent Petroleum Co., Sinclair Prairie Oil Co., and C. A. Palmer.

The Deep Rock discovery, on drill-stem test in the lower Layton at 3,815-35 ft., recovered gas, 920 ft. of oil, and 100 ft. of mud in 45 minutes. In the Mississippi lime, a test at 4,915-39 ft., recovered 105 ft. of gas-cut mud in 1 hour. The well was drilled to a total depth of 6,026 ft. in the Wilcox sand, pipe set at 6,015 ft., plug drilled, and tubing run. On first test the well flowed 190 bbl. of 37° gravity oil in 4 hours and 25 minutes, with 1,180,000 cu. ft. of gas. The following day it was opened and flowed 105 bbl. in 2 hours.

MICHIGAN

Crawford County Test Good for 120 Bbl.

SAGINAW.—A Pure Oil Co. wildcat acidized for 120 bbl. a day in Crawford County's Beaver Creek Township features activities for the week in Michigan oil fields. A total of 20 completions was equaled by 20 new locations in 10 counties.

Six of the new completions were oil producers with total initial potential of 3,700 bbl., the bulk of it from three more wells in the Kimball Lake field of Newaygo County. Six gas wells combined for 31,500,000 cu. ft. Of the eight dry hole completions, five were wildcats. All of the gas wells are in Clare County. The other oil producers are a 360-bbl. well in Claybanks of Oceana and a 25-bbl. producer in Ottawa County.

Five of the new locations reported by the State Conservation Department are in Clare County, four in Allegan, three in Newyago, two in Crawford, one each in Arenac, Isabella, Leelanau, Montcalm, Kalamazoo, and Muskegon.

MICHIGAN SUCCESSFUL WILDCAT

Crawford County, Beaver Creek Township: Pure Oil Co. 1-A State-Beaver Creek, W/2 SW NW 17-25n-4w, flowed 120 bbl., acidized, TD 4,410 ft.

MICHIGAN WILDCAT FAILURES

Allegan County, Allegan Township: James M. Burton 1 Howard Haight, NW NW SE 26-2n-13w, dry in Traverse, TD 1,447 ft.

Kent County, Courtland Township: Sun Oil Co. 1 Fred Carlson, agent, SW SW SW 14-9n-10w, dry in Detroit River, TD 3,035 ft.

Tyrone Township: Byron MacCallum 1 Byron English, SE NE SE 28-10n-12w, dry in Traverse, TD 2,364 ft.

Oceana County, Leavitt Township: Cities Service Oil Co. 1 State-Leavitt, SE SE SW 17-15n-15w, dry in Traverse, TD 2,225 ft.

Osceola County, Cedar Township: Sun Oil Co. 1 May M. Richardson, S/2 NW SE 10-18n-9w, dry in Detroit River, TD 4,067 ft.

PERMIAN BASIN

Sterling County Well Seen as Good Pumper

MIDLAND.—Plymouth Oil Co. 1 Frost, Sterling County's first producer, was cutting up to 30 per cent water on latest reports, and bailing from 5 to 10 bbl. of oil an hour. Operators were confident the water was coming from up the hole and would be sealed off.

General opinion is that the well will make a good pumping well. On a drill-stem test, through perforations at 8,356-76 ft., it flowed better than 32 bbl. of oil in 4 hours through 5/8-in. bottom and 1-in. top chokes. Oil tested 46.3° gravity. Later, after being washed with 500 gal. of acid, the well kicked off on the swab and flowed 34 bbl. of fluid the first hour. Output then dropped to 6 bbl. the second hour and 2¾ bbl. the third hour. Flow then ceased when operators changed size of the choke and it was shut in in an effort to build up pressure.

In spite of the diminished flow, the well has created considerable interest and is considered an important strike. Location of the 1 Frost is in the NE SW Section 39, Block 2, H&TC Survey, some 12 miles north and slightly west of Sterling City. It is the first Ellenburger production on the northeast side of the Permian Basin and the first from any formation in the county. Nearest production is the Howard-Glasscock area, about 15 miles to the northwest. Plymouth officials had not released information on offset locations, at last report, but possibly three new tests in the area will be made in the future. Leasing was brisk as far away as 9 miles west of the discovery, where Ray Albaugh, Midland, had assembled a block of 24,000 acres. Most of this acreage was on the D. D. Parramore ranch.

In Crockett County, 6 miles northwest of Yates field of Pecos County, Byrd-Frost, Inc., Dallas, and Gulf Oil Corp. 1 J. B. Mayberry-J. Homer Tippett became the first Devonian producer for the county. On an elevation of 2,260 ft., the well entered the Devonian at 6,293 ft., and indicated first production on a drill-stem test at 6,295-6,345 ft., when it flowed at an es-

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timated rate of 5,000,000 to 10,000,000 cu. ft. of gas a day. It was deepened to 6,376 ft., and with packer at 6,293 ft., it unloaded oil for 45 minutes at the rate of 25 bbl. an hour. Final recovery of this second test was 300 ft. of clean oil and 300 ft. of heavily oil-cut mud. On a test from 6,309-99 ft., with 5/8-in. bottom-hole choke, gas come to the surface in 43 minutes, oil-cut mud in 55 minutes, and clean oil at the end of 60 minutes. It then flowed to storage at the rate of 16.5 bbl. of oil the first hour, 24.8 bbl. the second hour, 23.4 bbl. the third, and 24.8 bbl. the fourth hour, with no water. When the drill pipe was broken down, an additional 1,836 ft. of clean oil was recovered.

Operators were to drill ahead to test the Ellenburger, and on last report had found no additional pay in drilling to 6,485 ft. A 1-hour drill-stem test at 6,438-85 ft. recovered 30 ft. of drilling mud, with no shows.

Pure Oil Co. and Humble 1 E. P. Cowden, Ellenburger discovery in the Dollarhide field of southwest Andrews County, ran elecrical survey and was circulating while awaiting 7-in. casing. Pipe was to be set on top of the Ellenburger at 9,990 ft., after which the hole will be deepened before further testing is done.

WEST TEXAS SUCCESSFUL WILDCAT

Crockett County: Ellenburger discovery, Humble Oil & Refining Co. 1 Elizabeth C. Mitcham, Sec. 12, Blk. AB, Massey Sur., 14 mi. NE Ozona, flowed 488 bbl. oil a day through ¼-in. choke on 2-in. set at 8,116 ft., top pay 8,090 ft., GOR 1,105:1, gravity 41.6°, tubing pressure 255 lb., casing pressure 660 lb., perforated casing 8,092-8,105 and 8,112-8,122 ft., completed natural, elevation 2,461 ft.

WEST TEXAS WILDCAT FAILURES

Crockett County: Honolulu & Signal Oil 1 J. W. Henderson, Sec. 8, Blk. M, GC&SF Sur., 18 mi. SW Ozona, dry, TD 1,070 ft. in limestone, hole full of water at 685 ft.

Pecos County: J. V. Massey et al 1 O. W. William estate, Sec. 99, Blk. 8, H&GN Sur., 2½ mi. NW Pecos Valley, dry, TD 2,501 ft., slight show gas 1,745 ft., show oil and gas 1,810 ft., sulfur water 1,985 ft.

Regan County: Humble Oil & Refining Co. 1-D Sawyer Cattle Co., Sec. 78, Blk. 1, T&P Sur., 14 mi. NE Big Lake, dry, TD 9,810 ft., Ellenburger 9,735 ft., elevation 2,449 ft.

Scurry County: Signal Oil Co. 1 J. C. Whatley, Sec. 548, Blk. 97, H&TC Sur., 5 mi. NE Dermott, dry, TD 2,080 ft.

TEXAS PANHANDLE WILDCAT FAILURE

Hale County: Barnsdall Oil Co. 1 R. C. Camp, Sec. 13, Blk. D-8, ELRR Sur., 5 mi. NE Abernathy, dry, TD 8,210 ft., San Andres 2,890 ft., Glorietta 4,220 ft., Tubb 5,420 ft., Wolfcamp 6,430 ft., green shale 7,700 ft., black shale 7,770 ft., by samples, elevation 3,385 ft.

Lamb County: Sunray Oil Corp. 1 A. C. Gipson, Lab. 18, Lodge 685, SCL Sur., 5 mi. S Littlefield, dry, TD 6,508 ft., San Andres 3,200 ft., Glorietta 4,600 ft., Clearfork 5,230 ft., elevation 3,515 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—Continental Oil Co. 1 Royce Lankford, Chaves County test to the pre-Cambrian, 1½ miles northeast of Hagerman, was drilling ahead below 6,385 ft. in limestone. It topped the Glorietta at 2,050 ft., and red shale around 4,370 ft. In Eddy County, Grayburg Oil Co. 13-B Keeley, 26-17s-29e, southwest outpost to the Grayburg-Jackson area, acidized with 1,500 gal. at 2,820-3,050 ft. and flowed 211 bbl. of oil in 14 hours, through open 2-in. tubing set at 2,986 ft. Operators then retreated with 3,500 gal. and were to continue testing.

In Lea County, Amerada Petroleum Corp. 5 Phillips, 1-20s-36e, deep test to the Ellenburger in Monument field, was drilling below 7,372 ft. The same company's 2 H. S. Record, 25-19s-35e, on the west side of Monument, was to be a 12,000-ft. test. On last report it was drilling below 4,575 ft. R. Olsen et al 1 Wimberly, 23-25s-37e, Ellenburger test 3½ miles east of Jal, was drilling below 6,873 ft. in limestone. It topped the Yates at 2,310 ft., San Andres at 3,620 ft., and the Glorietta at 4,620 ft. Between the Drinkard and Skaggs-Cass producing areas, Stanolind Oil & Gas Co. 1 Southland Royalty Co., 8-21s-37e, was drilling ahead below 6,220 ft. in limestone, with no shows reported.

SOUTHEAST NEW MEXICO WILDCAT FAILURES

Lea County: Mid-Continent Petroleum Corp. 2 A. B. Reeves, NW NW NW 29-20s-37e, dry, TD 7,150 ft., Yates 2,680 ft., Glorietta 5,300 ft., Tubbs 6,550 ft., elevation 3,527 ft.

Tide Water Associated Oil Co. 1-D Marshall, SW NW 13-21s-36e, dry, TD 7,978 ft., San Andres 4,030 ft., Glorietta 5,290 ft., Tubbs 6,480 ft., elevation 3,535 ft.

N. CENTRAL TEXAS

Snowden 1 Howsley Test A Mississippian Discovery

WICHITA FALLS.—J. H. Snowden et al 1 Howsley, Section 300, BBB&C Survey, southeast of Throckmorton in Throckmorton County, is a definite Mississippian limestone discovery. Operators set casing at 4,644 ft., drilled plug, when the well kicked off and started flowing oil. No estimate was made on the flow, but tanks are being erected and tubing run for completion tests. Total depth is 4,719 ft., 54 ft. into the Mississippian. Previous tests, at total depth of 4,717 ft., swabbed at the rate of 7½ bbl. of oil an hour, with no water.

New Mississippian production was reported in Young County, 3 miles southeast of Padgitt, at R. C. Lipscomb 1 Foster, Section 342, TE&L Survey. After setting casing to 4,679 ft., operators acidized with 100 gal. of mud acid, and the well kicked off to flow an estimated 50 bbl. of oil an hour. Total depth is 4,691 ft.

First pay in the Mississippi lime for Graham field, southern Young County, was reported at Humble Oil & Refining Co. 4 M. K. Graham. The well flowed 35 bbl. of oil in 30 minutes, through ½-in. choke, when the plug was drilled on casing set at 4,623 ft. Completion tests were to be made.

In Jack County, 3¼ miles southwest of Jacksboro, Warren Oil Corp. 1 E. L. McDowell was drilling ahead after making drill-stem tests in the Ellenburger at 5,751-71 and 5,745-64 ft. Both tests recovered only gas-cut mud. This test had recovered shows of oil from 5,744-49 ft., while drilling. The section has been identified as the Ellenburger, although no top has been called.

A third completion for the Record Mississippi limestone field of southern Throckmorton County was scheduled last week at Fred M. Manning, Inc. 2 James R. Record. Location is Section 1,609, TE&L Survey, and a west offset to the ½-mile northeast extension to the field. Top of the Mississippi was called at 4,655 ft. First test at 4,690 ft., using ¼-in. choke, produced only a slight blow of air and recovered 20 ft. of drilling mud. A second test, open 1 hour, at 4,690-4,709 ft., brought gas to the surface in 16 minutes, then flowed oil at the rate of 40 bbl. an hour. Flowing pressure was 225 lb.

NORTH CENTRAL TEXAS WILDCAT FAILURES

Archer County: Fain & McGaha 1 J. R. Parkey "B," Hooper & Wade Sur., A-689, 6 mi. SE Dundee, dry, TD 5,411 ft., Caddo 4,970 ft., Mississippi 5,311 ft., no shows reported.

Scott Bros. 1 C. L. Abercrombie, Blk. 153, Harris Subd., 2 mi. S Archer City, dry, TD 1,294 ft. in sandy limestone.

Baylor County: E. R. Marchman 1 C. T.

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Porter, E. Brown Sur., A-20, 9 mi. SE Seymour, dry, TD 840 ft.

Childress County: Amerada Petroleum Corp. 1 Alice Middleton, Sec. 388, Blk. H, W&NW Sur., SE corner of county, dry, TD 8,497 ft., Wichita-Albany 1,920 ft., Pennsylvanian 3,200 ft., Strawn 5,520 ft., Ellenburger 8,340 ft.

Cooke County: F. & G., Oil Co. 1 Euel Mann, J. O. Hill Sur., 4½ mi. SE Valley View, dry, TD 2,000 ft., show of asphalt in lime and shale streaks at 1,943-55 ft.

Wichita County: Hastings & Knight 2 W. W. Overby, H. B. Balch Sur., 4 mi. E Kamay, dry, TD 819 ft. in sand.

Chas. E. Morrison 1 L. B. Slaughter, Sec. 21, H&GN Sur., 5 mi. E Electra, dry, TD 2,008 ft., sand with show of oil 1,899-1,912 ft.

Chas. E. Morrison 1-B Slaughter, Lot 2, Sec. 16, HT&B Sur., 5½ mi. E Electra, dry, TD 2,038 ft. in shale.

Frank Wood 1 H. C. Obenhaus, MEP&P Sur., A-230, 5½ mi. NE Electra, dry, TD 2,216 ft. in shale, sand with show of oil 1,714-16 ft.

Wilbarger County: Paradise Oil Co. 1 W. T. Waggoner "K," Sec. 21, Blk. 14, H&TC Sur., 14 mi. SE Vernon, dry, TD 4,822 ft., Ellenburger 4,772 ft.

WEST CENTRAL TEXAS WILDCAT FAILURES

Brown County: Lydia Johnson 1 C. C. Goss, Sec. 16, BBB&C RR Sur., 5 mi. N May, dry, TD 3,540 ft., Caddo 2,522 ft., Ellenburger 3,422 ft., swabbed salt water in Caddo.

Jones County: Creslenn Oil Co. 1 Mat Caton, Sec. 9, D&DA Sur., 2 mi. NW Avoca, dry, TD 3,385 ft., Palo Pinto 3,369 ft., light odor 2,044 ft. in limestone.

San Saba County: Jackson & Seay 1 T. K. Adams, Carl Zuhl Sur., 2½ mi. NW Richland Springs, dry, TD 755 ft. in limestone.

Shackelford County: S. D. Johnson et al 1 T. Newcomb, Sec. 4, Blk. A, AB&M Sur., NW corner of county, dry, TD 5,255 ft., Mississippi 4,986 ft., Ellenburger 5,153 ft., slight show of oil in limestone 3,676 ft., sand with slight show oil 4,975-83 ft.

SOUTHWEST TEXAS

Nueces County Gets New Oil Discovery

CORPUS CHRISTI.—A new oil-pay discovery in the new "Bishop" field of southwestern Nueces County, H. R. Smith & W. C. McBride, Inc. 1 King Ranch, gaged 66 bbl. of 41°-gravity oil per day through a 7/32-in. choke on potential gage, with gas-oil ratio of 375. Production is through perforations at 7,800-34 ft., with top of pay at 7,800 ft. Total depth is 8,320 ft., and 5½-in. casing is set at 7,899 ft.

The Chicago Corp. 7 W. L. Goldston et al, at Los Indios gas-condensate field, in Hidalgo County, has been completed for the field's first oil producer, in a new pay zone. Total depth is 7,268 ft., with 5½-in. casing set on bottom and perforated at 7,113-22 ft. for the completion. No potential has been run.

Seaboard Oil Co. 22 James P. Luby, in Luby field, Nueces County, an old well drilled deeper, has been completed for 21,500,000 cu. ft. of gas and 322 bbl. of condensate per day on open flow through perforations at 6,840-50 ft. in a new pay zone for the field. It was completed originally through perforations at 5,061-66 ft. as an oil producer. Operators drilled to new total depth of 7,028 ft., for the completion.

Kirkwood & Morgan et al 1 McLean, wildcat 1½ miles southwest of production at Charlotte field, in Atascosa County, is testing open hole at 5,155-5,237 ft. in the Navarro sand. The Navarro was topped at 5,156 ft. and sand with oil shows logged at 5,156-69 ft., 5,174-96 ft., 5,201-04 ft., and 5,219-31 ft. Total depth is 5,237 ft., with 5½-in. casing set to 5,155 ft. for the completion attempt. This well is located in J. Poitevent Survey 1.

There were 33 new locations reported this week with 13 being wildcat starts, 3 in Starr, 2 in Duval, Edwards, and San Patricio, and 1 each in Atascosa, Kleberg, Nueces, and Zapata. Four exploratory tests were successful, three in Nueces and one in Starr counties. Seven of the wildcats were dry, two in Duval, and one each in Bexar, Dimmit, Jim Hogg, Nueces, and Starr counties.

SOUTHWEST TEXAS SUCCESSFUL WILDCATS

Nueces County: New oil pay Bishop pool—H. R. Smith and W. C. McBride, Inc. 1 King Ranch, in Sec. 152, Bishop Subd. of Weil ranch, top pay 7,800 ft., TD 8,320 ft., perf. 7,800-34 ft., IP: 66 bbl. oil per day through 7/32-in. choke, gas-oil ratio 375, TP 100 psi., casing sealed, gravity 41°, no water.

New condensate pay, Flour Bluff pool—Humble 9 J. O. Phillips, in Flour Bluff and Encinal Farm & Garden tracts, Lot 1, Block 55, top of pay 8,288 ft., TD 9,030 ft., perf. 8,288-98 ft., IP: 808,000 cu. ft gas per day and 16 bbl. condensate per day through a ⅛-in. choke, gas-condensate ratio, 50,500, TP 3,140 psi., SIP 3,225 psi., gravity 51.6°, no water.

New condensate pay, Luby field—Seaboard Oil Co. 22 James Luby, in Canutillo Colony Ditch Co. Survey, old well drilled deeper, old TD 5,072 ft., deepened to new TD 7,028 ft., top pay 6,840 ft., perf. 6,840-50 ft., IP: 21,500,000 cu. ft. gas per day and 322 bbl. condensate per day on open flow, SIP 2,720 psi., no water.

Starr County: New gas discovery: W. B.

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Jewel Osborn and Mid-Continent Pet. Corp. 1 John Clopton, in Lot 19, Blk. 2, B. & B. Oil Co. Subd., in Porcion 86, 6½ mi. E of Rio Grande City, top pay 5,660 ft., TD 6,256 ft., perf. 5,660-5,700 ft., IP: 200,000 cu. ft. gas per day on open flow, and 1 bbl. per day of oil, SIP 1,000 psi., no water.

SOUTHWEST TEXAS WILDCAT FAILURES

Bexar County: C. Hughes Thomas 1 H. R. & S. Z. Ellison, H. Muerer Sur. 359, 12 mi. W of San Antonio, dry, TD 410 ft.

Dimmit County: Texas Co. 1 Ethel Richardson Payne et al, in H&GN Sur. 5, 5 mi. SE of Carrizo Springs, dry, TD 4,015 ft.

Duval County: Daubert & Aching 1 Jas. F. Welder Hrs., in J. Pointevent Sur. 213, 7 mi. NE of Freer, dry, TD 1,570 ft.

Milam Drlg. Co. & Don Marsh 1 J. C. Thomas, in Jose Ynojosa Gr., 4 mi. S of Realitos, dry, TD 5,156 ft.

Jim Hogg County: Don H. Marsh 1 Isabel D. de Gutierrez Est., in Mrs. E. Tribble Sur. 620, 18 mi. SW of Hebbronville, dry, TD 4,010 ft.

Nueces County: Southern Minerals Corp. & L. A. Douglas 1 W. M. Schwenke, in O. M. Oliver Sur. 164, 3 mi. SW of Clarkwood, dry, TD 7,502 ft.

Starr County: Lockhart & Co. 1 Domingo L. Garza, C&MRR Co. Sur. 753, 12 mi. NE of Rio Grande City, dry, TD 3,200 ft

KANSAS WILDCAT FAILURES

Barton County: Vickers 1 Hagen, SW SE NW 28-20s-11w, dry, TD 3,375 ft., anhydrite 523 ft., Lansing-Kansas City 3,075 ft., Arbuckle 3,348 ft.

Ellis County: H. V. Elwell 1 Sessin, NE NW SE 15-11s-19w, dry, TD 3,532 ft., anhydrite 1,278 ft., Topeka 2,943 ft., Lansing-Kansas City 3,214 ft., Basal Kansas City 3,443 ft., cherty conglomerate 3,474 ft., Arbuckle 3,529 ft.

Darby & Bothwell 1 Schermer Estate, NE NE NW 4-12s-18w, dry, TD 3,661 ft., anhydrite 1,368 ft., Topeka 3,045 ft., Heebner 3,299 ft., Lansing-Kansas City 3,337 ft., Basal Kansas City 3,579 ft., conglomerate 3,634 ft., Simpson 3,638 ft., Arbuckle 3,646 ft.

Pawnee County: H. H. & B. Drilling 1 Steuckemann, NW NW NE 11-21s-17w, dry, TD 3,942 ft., anhydrite 1,058 ft., Heebner 3,435 ft., brown lime 3,521 ft., Lansing-Kansas City 3,531 ft., Marmaton 3,815 ft., conglomerate 3,854 ft., Arbuckle 3,892 ft.

Rooks County: Tom Palmer 1 Henderson, SE SE SE 6-10s-17w, dry, TD 3,737 ft., anhydrite 1,390 ft., Topeka 3,020 ft., Heebner 3,260 ft., Dodge 3,284 ft., Lansing 3,302 ft., Basal Kansas City 3,535 ft., cherty conglomerate 3,563 ft., Simpson 3,637 ft., Arbuckle 3,687 ft.

Saline County: Jackson Drilling 1 Weiss, NW NW NE 21-14s-2w, dry, TD 3,364 ft., Mississippian 2,616 ft., Hunton 2,975 ft., Maquoketa 3,180 ft. with slight show of oil, Viola 3,230 ft., Simpson 3,311 ft., Simpson sand 3,345 ft., Hunton 2,975 ft.

Stafford County: Cities Service Oil 1 Witt "B," NW NE SW 26-21s-12w, dry, TD 3,700 ft., Lansing-Kansas City 3,273 ft., cherty conglomerate 3,549 ft., Arbuckle 3,666 ft.

KANSAS

Arbuckle Discovery Prospect In Stafford County

STANOLIND OIL & GAS CO. 1 Pundsack, SE SE SW 19-21s-13w, Stafford County, has pipe set 1 ft. in Arbuckle at 3,736 ft. Drill-stem test at 3,737-43 ft. recovered 300 ft. 27°-gravity oil. Well is located about 1½ miles west of nearest production in Hazel pool, which also produces from Arbuckle.

Continental Oil Co. 1 Gilbert, NE NE SE 6-9s-18w, Rooks County, discovery well of East Barry pool, has been completed with initial potential of 609 bbl., natural, from Arbuckle lime topped at 3,498 ft. This well is 2 miles east of the Barry pool.

Continental Oil Co. 1 King, NE NE SW 35-12s-20w, Ellis County, made 15 gal. oil and 40 gal. water when plug was drilled out to total depth of 3,933 ft. Hole has been plugged back 10 ft. for further testing. Drill-stem test at 3,884-3,924 ft. recovered 60 ft. oil-cut mud. Pipe was set 2 ft. in the Arbuckle at 3,884 ft. This test, which is 3½ miles east of the Ellis pool, found Arbuckle at —1,673 which is 30 ft. higher than a dry hole 2½ miles north, 80 ft. higher than a dry hole 1 mile south, and 40 ft. higher than a dry hole 2 miles east.

Musgrove Petroleum Corp. et al 1 Lanterman, NW NW NW 23-22s-12w, Stafford County, had a show of free oil when plug was drilled out and hole deepened 1 ft. to 3,675 ft. Pipe was set on top of Arbuckle at 3,672 ft. Drill-stem test in Lansing recovered 85 ft. of oil-cut mud. Lansing was logged at 3,304 ft. and Simpson at 3,622 ft.

J. M. Huber Corp. et al have started drilling in 1 Berryman, SE SE SE 12-31s-21w, a rank wildcat in eastern Clark County. This test is about 12 miles southwest of the Alford gas pool in Kiowa County. Seven miles southeast of this test, Gulf Oil Corp. 1 Lorimer, SE SW 36-31s-20w, Comanche County, is drilling below 6,041 ft., and 7 miles almost due east Stanolind 1 Winkler, NE NE NW 6-31s-19w, is drilling below 4,853 ft.

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APPALACHIAN FIELD

Columbian Carbon Testing Logan District Strike

PITTSBURGH.—In Logan district, Logan County, West Virginia, Columbian Carbon Co. is shut down in 962 Island Creek Coal Co., testing another oil strike in the Big lime which was topped at 2,021 ft. Oil at 2,163 ft. gaged 90 bbl. in 1 hour and 25 minutes when it was shut in. With the oil and gas, it shows a rock pressure of 212 psi. in 16 hours.

In Pocatalico district, Putnam County, Godfrey L. Cabot, Inc., completed a good Oriskany well in semiwildcat territory with 1,223 J. L. McLean Heirs which gaged 7,154,000 cu. ft. of gas, after shot. From a surface elevation of 1,001 ft., the Corniferous lime was topped at 4,982 ft., Oriskany 5,077,5,100 ft., gas 5,082-86 ft., shot, shot 5,078-98 ft., rock pressure 1,750 psi. in 13 hours, total depth 5,101 ft.

In Center district, Wyoming County, Hope Natural Gas Co. completed 9,094 New River and Consolidated Coal Co. good for 1,332,000 cu. ft. of gas from the Berea (3,731-37 ft.) with a rock pressure of 750 psi. in 24 hours; total depth 3,737 ft. In Oceana district, this company completed 9,120 Loup Creek Colliery Co. good for 2,369,000 cu. ft. of gas with the Ravencliff sand 2,100-41 ft., gas 2,119-35 ft., shot 2,119-40 ft., total depth 2,165 ft.

In Lincoln district, Wayne County, United Fuel Gas Co. completed a large Maxton sand gas well in 6,169 F. D. Caldwell which gaged 2,100,000 cu. ft. from total depth of 1,105 ft.

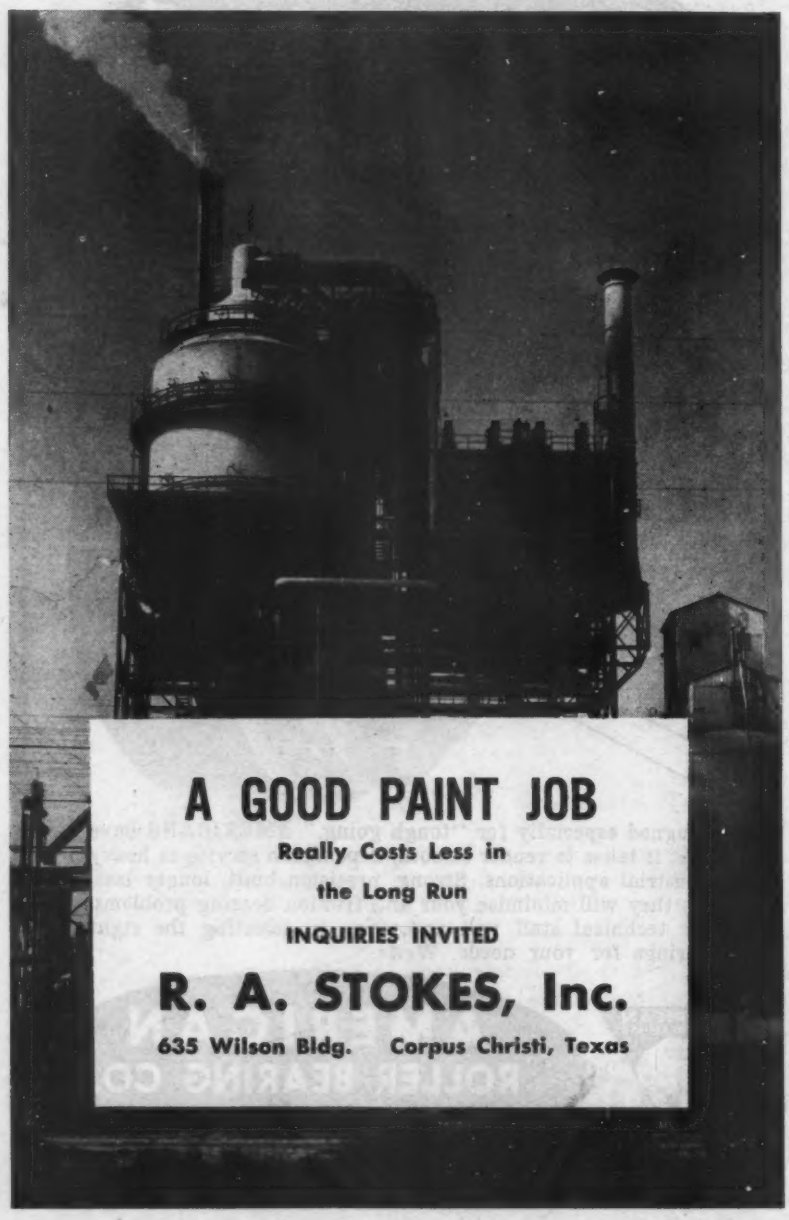
New locations totaled 17. They were the following districts: Elk, Barbour County; Sherman, Calhoun County; Henry, Clay County; Center and Troy, Gilmer County; Ripley, Jackson County; Cabin Creek, Kanawha County; Harts Creek, Lincoln County; Logan, Logan County; Union, Marion County; Richland, Ohio County; Pocatalico, Putnam County; Trap Hill, Raleigh County; and Grant, Wayne County.

On Chestnut Ridge in Georges Township, Fayette County, New Penn Development Co. et al drilled through the Tully lime at 6,504-6,600 ft. in Mary I. Smith, the south offset of the large No. 1 gas well.

New locations totaled seven. They were in the following townships: Patton, Allegheny County; Bethel, Madison and Plum Creek, Armstrong County; German, Fayette County; Franklin, Greene County; White, Indiana County, and West Bethlehem, Washington County.

WEST VIRGINIA SUCCESSFUL WILDCAT

Wyoming County, Baileysville district: Hope Natural Gas Co. 9,112 J. M. Crutchfield, 3,723,000 cu. ft. gas, natural; Ravencliff 1,400-48 ft., Big lime 2,466 ft., Berea 3,530 ft., gas 3,544-60 ft., TD 3,560 ft.



LA.-ARK.

DeSoto Parish Test Ready to Acidize

SHREVEPORT.—E. C. Laster 1 Witherspoon, wildcat in 3-14n-14w, northwest of the Holly field of DeSoto Parish, depth 5,389 ft., was preparing to acidize through perforations at 5,254-66 ft. A drill-stem test of the perforations, using ⅜-in. bottom and 5/32-in. top chokes, brought gas to the surface in 15 minutes, but registered only 170 psi. working pressure. When chokes were removed, pressure dropped to 5 psi., and when shut in 40 minutes, pressure rose to 900 psi.

In Bienville Parish, The Texas Co. 1 W. A. Givens, 25-16n-9w, was drilling below 5,366 ft. in brown shale and limestone. Cores at 4,876-87 recovered 2 ft. of gray, dense limestone, having a few pin-points of oil. The bottom 4 ft. of the core was gray limestone having a slight odor and bleeding oil. In 14-14n-6w, Union Producing Co. 1 Frazier was coring below 7,333 ft. in shale and streaks of limestone, with no shows.

Pan American Producing Co. 1 McGraw, 24-10n-8e, Catahoula Parish, was waiting on cement after squeezing all perforations, at plugged back total depth of 2,535 ft. A drill-stem test of the perforations at 2,440-60. ft., open 46 minutes, recovered 26 sands of gas-cut salty mud. Flowing bottom-hole pressure was 1,075 psi., increasing to 2,110 psi. when shut in. In Concordia Parish, H. L. Hunt 1 Fisher Lumber Co., 25-7n-8e, had total depth of 8,988 ft. and was fishing drill pipe at 8,014 ft. C. H. Murphy, Jr., 1 Tensas Delta, 36-6n-4e, was waiting on orders at total depth of 6,345 ft. No shows were reported in the Wilcox at 3,350 ft., and the Midway at 6,130 ft. In Red River Parish, Union Producing Co. 1 Anna Campbell, 20-12n-10w, was drilling ahead below 7,360 ft. A 15-minute test at 7,087-7,170 ft. produced no pressure, and recovered 10 ft. of drilling mud. A 25-minute test at 7,157-7,255 ft., using ¼-in. chokes, produced a slight blow and recovered 25 ft. of drilling mud, with no shows.

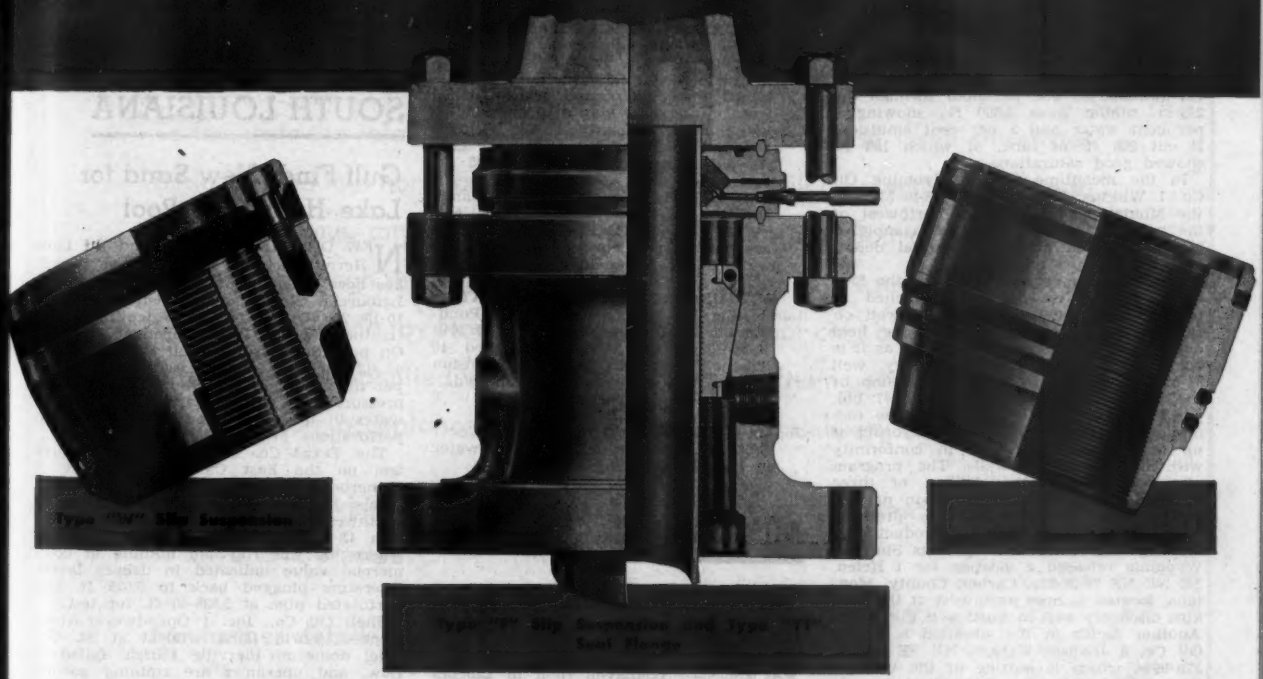
Arkansas wildcat reports included Carter Oil Co. 1 Isom, 33-9s-1w, Dasha County, drilling below 4,172 ft. Cores at 4,160-72 ft. recovered 6 ft. of slightly porous sand with no shows. Tops logged were: Arkadelphia 3,870 ft., chalk 4,035 ft., and the Nacatoch sand 4,157 ft. In Ashley County, Chicago Corp. 1 Morris,, 31-18s-4w, was drilling below 2,770 ft., in gas rock topped at 2,768 ft., by samples. Barnsdall Oil Co. and G. H. Vaughn 1 Bodcaw, Lafayette County test in 8-18s-23w, was waiting on cement at 4,500 ft., total depth, after setting casing at 4,498 ft.

NORTH LOUISIANA WILDCAT FAILURES

Caddo Parish: Big Chief Drilling Co. 1-A Slattery, 15-19n-15w, dry, TD 2,493 ft., cored 2,392-2,406 ft., hard, gray to red shale, slight oil and gas odor.

Catahoula Parish: Pan American Producing Co. 1 McGraw, SE SE SE 24-10n-8e, dry.

Now 3 Interchangeable Casing Hangers and Seals for Cameron Forged Steel Casing Heads



Cameron Forged Steel Casing Heads and Spools have set a new high standard for quality in the well head field. The close-grained, homogeneous alloy steel in these new heads can only be obtained by forging . . . a process which has been considered commercially unfeasible for flanged well heads until recently when Cameron installed the latest development in forge plant equipment—a 5000-ton closed die hydraulic press.

Interchangeable casing hangers and seals have long been a Cameron feature, enabling the operator to select the type of hanger best suited for the type of casing and the sub-surface conditions encountered while drilling.

TYPE "W" is an old Cameron favorite. An oil-resistant seal ring bolts down on top of the slips by means of socket head cap screws. Slips and seal ring are assembled around the pipe and dropped into the casing head. Initial seal is effected when pipe is suspended, but additional sealing compression is applied by tightening the cap screws when the preventers are removed.

TYPE "F" consists of 6-segment slips in a cage which may be easily "latched" around the pipe. The TYPE "YT" SEAL FLANGE (illustrated) packs off around the pipe, utilizing bolt compression to force the resilient seal ring into sealing engagement with the pipe. This flange is available with or without a test port.

TYPE "PF" HANGER presents an innovation in threaded suspension type hangers. In addition to its "O" ring seals, an additional resilient seal is provided on top of the hanger. Sealing compression is supplied when the tubing head is installed, the lower flange contacting the gland ring provided on top of the packing.

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TD 6,285 ft., recovered salt water on DST at 2,440-99 ft.

Madison Parish: C. H. Murphy, Jr., 1 Mahoney, 11-17n-10e, dry, TD 3,497 ft., no tops reported.

Red River Parish: Union Producing Co. 1 Campbell, 20-12n-10w, dry, TD 7,612 ft., Pettit porosity 6,332-54 ft., Travis Peak 6,682 ft.

Sabine Parish: H. H. Duck 1 Peavy-Wilson, S½ SE SW 31-8n-13w, dry, TD 5,195 ft., no tops reported.

ROCKY MOUNTAIN

Elk Basin Group Sets Up Drilling Program

DENVER.—A temporary program for producing Madison lime wells in Elk Basin field and for drilling additional wells for the next 3 months was reached by the Unit Operators Committee. At the end of that period it is expected that sufficient data on the new horizon will be available to enable them to formulate a premanent program.

At present there is one Madison lime well completed in the field proper. This was Stanolind Oil & Gas Co. 38-M Unit, NE SE NE 24-58n-100w, an old Tensleep sand well on Continental Oil Co. lease which was deepened to the Madison by Stanolind, the unit operator. It is located on the top of the structure. A second well 2½ miles southeast of the Madison discovery is being deepened to that horizon. This is Stanolind 95-M Unit, NE NW SE 31-58n-99w. It is on a lease held by Carter Oil Co. It is a near completion in the Madison, and at a total depth of 5,941 ft., swabbed 40 bbl. per hour through the 2½-in. tubing from 5,800 ft., showing 4 per cent water and 2 per cent emulsion. It cut 908 ft. of lime, of which 198 ft. showed good saturation.

In the meantime Sinclair-Wyoming Oil Co. 1 Wilkins, NW SW NW 28-9s-23e, on the Montana side 1½ miles northwest of the nearest Tensleep well, was completed in the Madison at 6,795 ft., total depth, for 4,942 bbl. per day.

Under the temporary agreement the Sinclair-Wyoming well will be pinched in to 1,000 bbl. per day. The 95-M well on the Carter lease, likewise will be held down to 1,000 bbl. per day as soon as it is completed. The Madison discovery well 38-M Unit cased off the upper section of the lime, and was conpleted for 247 bbl. per day from the lower part of the formation. It will be reworked to bring it up to 1,000 bbl. per day in conformity with the other two wells. The program also provides for the drilling of three additional wells in the Elk Basin participating area to determine the probable areal extent of the Madison production.

Along with these developments Sinclair-Wyoming released a location for 1 Helen, SE NE NE 29-9s-23e, Carbon County, Montana, located ¼ mile northwest of the Wilkins discovery well in Northwest Elk Basin. Another factor in the situation is Carter Oil Co. 8 Johnson-Watson, NE SE SW 8-57n-99w, which is outside of the unit on the southeastern side of the field ¾ mile from the nearest Tensleep producer. It is bottomed at 3,426 ft., and in a drill-stem test at 3,401-26 ft., open 15 minutes, recovered gas estimated at 3,700,000 cu. ft. per day. It is on the east side of a fault, and only 1½ miles from the nearest well in the South Elk Basin field which is operated by Continental Oil Co.

Oil show in Utah wildcat.—Carter Oil Co. 1 Knudson, SW NE 18-5s-21e, West Vernal district, Uintah County, Utah, recovered 40 ft. of oil and 200 ft. of oil-cut mud in a drill-stem test, tool open 2 hours. A show of gas was recovered in 1½ hours. Core taken at 4,063-80 ft. resulted in a recovery of 12 ft. of sand, of which 11 ft. was saturated with dark oil. A drill-stem test at 4,056-80 ft., open 30 minutes, had a recovery of 240 ft. of gas-cut mud. Another at 4,206-18 ft., open 1½ hours, recovered 25 ft. of mud.

South Sand Creek discovery.—General Petroleum Corp. 45-26 Government, NE NE SW 26-46n-91w, South Sand Creek district, Washakie County, Wyoming, a wildcat in the Big Horn Basin 4½ miles southeast of same company's recent South Fork discovery, is reported preparing to run casing and complete in the third Frontier sand.

Worland extension.—Pure Oil Co. 5 Unit, C SW NW 21-48n-92w, Worland Dome, Washakie County, Wyoming, 1 mile southeast of 3 Unit, the nearest producer and best of the wells so far completed, had the Embar at 10,066 ft. Same company's 6 Unit, NE NE NW 19-48-92, ¾ mile southwest of 3 Unit, had the Embar at 10,260 ft., and in drill-stem test at 10,259-372 ft., had a show of gas in 9 minutes, and recovered 2,700 ft. of oil and 180 ft. of mud in 26 minutes.

Circle Ridge.—Continental Oil Co. 6 Shoshone, NE NW SW 6-6n-2w, Circle Ridge field, Fremont County, Wyoming, an outpost on the east and one of several wells intended as Madison tests, but did not reach the objective, bailed 8 bbl. per hour at 650-765 ft., and may complete without going to the Madison.

New operations.—Seventeen new operations were reported, of which 3 were in the Rangely field in Colorado, 4 in Wyoming, and 10 in Montana. Two wildcats in Wyoming are included. Stanolind Oil & Gas Co. has made a location for a Madison test in 1 Unit, SW SE NE 24-51n-93w, Torchlight field, Big Horn County. The other is Tidewater Oil Co. 41-16 Tribal, NE NE NW 16-3n-1w, between Pilot Butte and Steamboat Butte fields.

WYOMING WILDCAT FAILURES

Oregon Trail, Fremont County: Sinclair-Wyoming Oil Co. 1 Unit, NE NE NW 24-27n-101w, TD 1,858 ft., P. & A. Bottomed in boulders and glacier drift., wore out 90 bits, may drill another.

Wyoming, Lincoln County: H. M. Williams 1 State Lot 1, 36-25½-115w. TD 2,386 ft., old hole deepened from 2,335 ft., P. & A.

Schmidt, Albany County: Front Range Drilling Co. 1 Government, NE NW SW 10-13n-76w, TD 1,300 ft., completed as water well. Sundance 200, Chugwater 313, Tensleep 1,288 ft.

WYOMING SUCCESSFUL WILDCAT

Lamb, Big Horn County: Hageman-Pond-Hanlon 2 Cities Service SW NE NW 12-51n-93w, TD 3,500 ft., pumped 10 bbl. per day. Embar 3,376 ft. Extension ¾ mile to northwest of 1 Stanolind.

MONTANA WILDCAT FAILURE

Joplin, Liberty County: Union Oil Co. 1 State, C 36-36n-7e, TD 2,293 ft., water in Bow Island sand, P. & A.

MISSISSIPPI

Three Completions Noted In Brookhaven Field

JACKSON.—Brookhaven field in Lincoln County received the greatest activity this week with three completions. Sun Oil Co. 1 D. Crump, NE SE 9-7n-7e, was completed with an initial production of 184 bbl. through perforations at 10,388-422 ft. Total depth 10,489 ft. The California Co. 1 Granberry Smith, 33-8n-7e, was drilled to depth of 10,453 ft., and completed pumping 257 bbl. of 27.7°-gravity oil through perforations at 10,354-372 ft., and 10,402-417 ft. Roeser & Pendleton 4 Cora Ballard, NW SE 17-7n-7e, flowed 446 bbl. of oil in 11 hours through ½-in. tubing choke, tubing pressure 375 psi. Total depth is 10,440 ft.

At Sandersville, Jones County, Union Sulphur Co. 1 Earline Parker, 31-10n-10w, is preparing to resume pumping tests after acidizing through perforations with 1,000 gal. of mud acid. Prior to initial pumping tests, casing was perforated 5,450-5,455 ft. with 50 shots, adding 5 ft. of section immediately below the previously perforated interval. Pumping tests indicated a very slow entry of heavy, black 10.8°-gravity oil.

Danciger Oil & Refining Co. 1 C. J. Simmons, deep test, 36-1n-12e, in Heidelberg field, Jasper County, reported shows in samples from 8,927-43 ft., 8,990-9,036 ft., and 9,194-9,210 ft. Operators are now taking sidewall samples to confirm extent of oil shows.

Gulf Refining Co. 2 J. A. Rowland, Trustee, et al, second test of Eunice prospect, Amite County, 29-4n-2e, has been completed dry at total depth of 11,580 ft. in Comanche. No shows were encountered in sands of upper and lower Tuscaloosa. This second test is located approximately 1 mile northwest of the 1 Rowland, first test of the prospect.

One new wildcat location was reported this week in Lincoln County. The five locations in proved areas are three in Mallalieu field, Lincoln County, and one each in Baxterville field, Lamar County, and Eucutta field, Wayne County. The 13 completions included 2 dry wildcats, 1 each in Amite and Humphreys counties, 8 oil wells and 3 dry holes in proven areas.

MISSISSIPPI WILDCAT FAILURES

Amite County: Gulf Refining Co. 2 J. A. Rowland Tr. et al "A," 29-4n-2e, dry, TD 11,580 ft., tops: Tuscaloosa 10,607 ft., Marine Tuscaloosa 10,950 ft., Comanche 11,550 ft., elev. 310.

Humphreys County: Cities Service Oil Co. 1 Jones Estate, 19-15n-1w, dry, TD 6,295 ft., tops: Wilcox 1,236 ft., Selma 3,963 ft., Eutaw 4,860 ft., Tuscaloosa 5,413 ft., Marine Tuscaloosa equiv. 5,775 ft., lower Tuscaloosa 5,824 ft., Comanche 6,267 ft.

SOUTH LOUISIANA

Gulf Finds New Sand for Lake Hermitage Pool

NEW ORLEANS.—A new sand for Lake Hermitage pool, Plaquemines Parish, has been opened by Gulf Refining Co. 17 Lafourche Basin Levee District, Section 10-18s-25e. Drilled to a total depth of 12,091 ft., the new sand was topped at 11,895 ft. On potential test this well flowed 91 bbl. of oil per day and 3,245,000 cu. ft. of gas per day through a 3/16-in. choke. Tubing pressure 3,600 psi., gravity 38.7°, with no water in the flow. Production is through perforations at 11,895-954 ft.

The Texas Co. 4 Miami Corp., wildcat test on the East Cameron Prospect of Cameron Parish, is testing in shallow sand levels. The test is approximately 4½ miles northwest of Mud Lake production in Section 13-14s-12w. Total depth is 11,699 ft. where log was run and nothing of commercial value indicated in deeper levels. Operators plugged back to 5,575 ft. and perforated pipe at 5,536-40 ft. for test.

Shell Oil Co., Inc. 1 Opendweyer-Alcux Cypress, north flank wildcat at St. Gabriel dome in Iberville Parish, failed to flow, and operators are running gas-lift valves for a completion test. Total depth of this hole is 11,000 ft., and perforations at 9,770-84 ft.

Barnsdall Oil Co. 1 Powell, wildcat in Longville area, 10-6s-9w, 2½ miles southeast of production in Longville field, has been completed dry at a total depth of 9,200 ft., with no shows reported.

There were 14 new locations reported this week with 3 being wildcat starts, 1 each in Allen, St. Landry, and Vermilion parishes.

SOUTH LOUISIANA SUCCESSFUL WILDCAT

Plaquemines Parish: New oil sand, Lake Hermitage pool—Gulf Refining Co. 17 Lafourche Basin Levee District, 10-18s-25e, TD 12,091 ft., top sand 11,895 ft.,

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perf. 11,895-954 ft., IP: 91 bbl. oil per day and 3,245,000 cu. ft. gas per day through a 3/16-in. choke, TP 3,600 psi., gravity 38.7°, no water.

SOUTH LOUISIANA WILDCAT FAILURE

Beauregard Parish: Barnsdall Oil Co. 1 Powell, Longville area, 10-6s-9w, 2½ mi. SE of production in Longville field, dry, TD 9,200 ft.

OKLAHOMA

Wilcox Sand Test Noble Co., Flows 50 Bbl. Oil Per Hour

WARREN OIL CORP. 1 Burgess, NE SE NW 8-21n-1w, Noble County, on drill-stem test at 5,167-78 ft. had gas at surface in 3 minutes and flowed oil in 56 minutes, estimated at 50 bbl. per hour. Pipe is set at 5,166 ft. and total depth is 5,178 ft. Operators are waiting on cement to set. Production is from top few feet of First Wilcox sand. Drill-stem test of Lower Laton at 3,817-35 ft. recovered 900 ft. of oil and 120 ft. of oil-cut mud. Locations have been made for Warren 1 McGuire, SW NW NE 8, a northeast offset to the Burgess well, and for Clark & Cowden Drilling Co. et al 1 Burgess, SE NE NW 8, a north offset.

Stanolind Oil & Gas Co. 1 Reinhart, SW SW 30-13n-2w, Oklahoma County, topped unconformity zone at 6,305 ft. and cores from 6,305-27 ft. showed oil staining. Drill-stem test at 6,307-27 ft. flowed oil in 10 minutes, flowed 17 bbl. oil to tanks in 20 minutes, and flowed 120 bbl. oil in 1½ hours. Gas volume was estimated at 3 to 5 million cu. ft. per day. Core from 6,327-43 ft. recovered 8 ft. of saturated unconformity and 1 ft. of Bois d' Arc lime. Top of Bois d' Arc is logged at 6,338 ft. This test is 1 mile south and 1½ miles west of gas-distillate production in the Witcher pool, and promises to be the first oil production in this area.

Mudge Oil Co. 1 Sebrinsky, SE NW SE 24-1n-7w, Stephens County, on 32-minute drill-stem test of Hoxbar sand topped at 7,182 ft., showed air immediately, gas in 26 minutes and oil flow estimated at the end of the test period at 20 bbl. of 40°-gravity oil per hour.

Oklahoma Natural Gas Co. 1 Lair, SW SW 21-13n-2w, which extends the Witcher pool ½ mile east, flowed gas at rate of 54 million cubic feet per day on open flow, with 18 bbl. distillate per million cubic feet gas. Shut-in pressure is 2,110 psi. While this test appears to limit basal Pennsylvanian production to the east, it gives the pool a new producing zone in the Hunton. The Lair was drilled to 6,171 ft., pipe was set at 6,168 ft., and perforations were made at 6,120-40 ft. Bois d' Arc was logged at 6,122-35 ft.

About 4 miles southeast of the Witcher pool, Gulf Oil Corp. 1 Frazier, NE NW 11-2n-2w, Oklahoma County, a south offset to the Munger pool discovery well, is plugged back from 6,751 ft. to 6,120 ft. to test Bartlesville sand at 6,070-91 ft. Pipe is set on top of Bartlesville. The Munger pool discovery well produces from Hunton at 6,142-65 ft.

Carter Oil Co. 1 Cottrell, SW SE 31-2n-1w, Garvin County, which marks the present northwest limit of the Katie pool, flowed 165 bbl. 43.2°-gravity oil in 24 hours from perforations at 6,170-75 ft.

OKLAHOMA SUCCESSFUL WILDCATS

Garfield County: Davon Oil Co. 1 Brunken, NE NW NE 32-23n-4w, pumped 50 bbl. of 37°-gravity oil per day from second Wilcox at 6,045-70 ft.; Oswego 4,965 ft., Mississippian 5,430 ft., Woodford 5,800 ft., Viola 5,880 ft., TD 6,082 ft.

Garfield County: New pay in New Garber—Cities Service Oil 2 Mariner, NW SE NW 6-22n-3w, 280,000 cu. ft. of gas from Oswego at 4,620-40 ft. and 4,660-85 ft., Tonkawa sand 3,572-3,698 ft., Layton 4,168-4,258 ft., Mississippi lime 4,830 ft., Woodford 4,894 ft., Wilcox 5,032 ft., TD 5,238 ft., OWWO.

Hughes County: Mid-Continent Petroleum Corp. 1 Meadors, NW NW NW 36-9n-10e, gaged 2,100,000 cu. ft. of gas from Booch at 2,250-80 ft.; coal 2,240 ft., Gilcrease 2,560 ft., Union Valley 3,166 ft., Cromwell 3,172 ft., TD 3,197 ft.

Lincoln County: Extension to West Davenport—Vickers & Mealy-Wolfe 1 Bradshaw, NW NW SE 8-14n-5e, flowed 23 bbl. of 39°-gravity oil per day from Prue sand at 3,470-85 ft., thhrough ¼-in. tubing choke, TD 3,485 ft.

Noble County: Davon 1 Tautfest, NE SW NE 32-24n-1e, pumped 10 bbl. of oil per day from Bartlesville at 4,315-80 ft.; Oread 2,345 ft., Tonkawa 2,670 ft., Layton 3,611 ft., Oswego 3,970 ft., TD 4,526 ft.

OKLAHOMA WILDCAT FAILURES

Comanche County: Loggie Bros. 1 Reinwond, N/2 SE SW SW 24-2n-11w, dry, TD 460 ft., show of gas from hole, no tops reported.

Cotton County: Tom Taylor 1 Philcott, SE NE SE SE 9-3s-10w, dry, TD 2,316 ft., sand 2,281 ft. and 2,297 ft., with a stain and odor of oil.

C. C. Winfrey et al 1 Poolaw, NW NW NE 29-5s-12w, dry, TD 2,006 ft., Megargle lime 1,819-48 ft., sand 1,406-32 ft., 1,702-50 ft. and 1,898-1,958 ft.

Creek County: J. J. Deaner 1 Shannon, NE SE NW 33-15n-7e, dry, TD 4,088 ft., Belle City 1,550 ft., Upper Hogshooter 1,470 ft., Lower Hogshooter 1,540 ft., Checkerboard 1,885 ft., Oswego 2,790 ft., no Prue, Verdigris 2,890 ft., Inola 3,340 ft., Bartlesville 3,390-3,440 ft., brown 3,490 ft., Mayes 3,630 ft., Woodford 3,916 ft., Sylvan 3,940 ft., Viola 3,996 ft., first Wilcox 4,042 ft., second Wilcox 4,072 ft.

Russell Maguire et al 1 Replogle, SW SE SW 7-16n-8e, dry, TD 3,780 ft., Hogshooter 1,430 ft., Checkerboard 1,775

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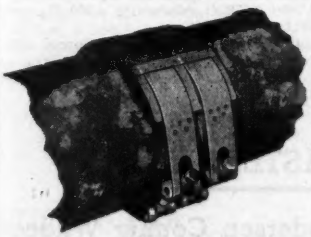

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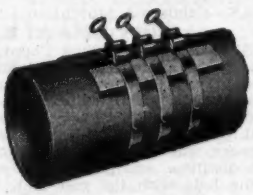

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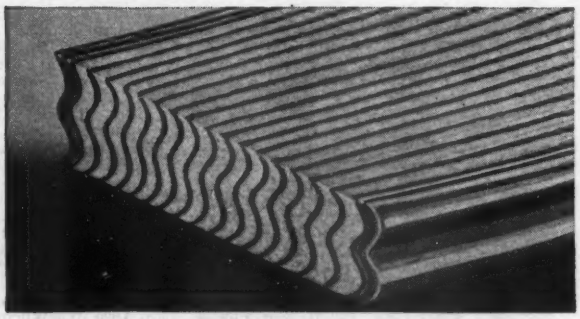

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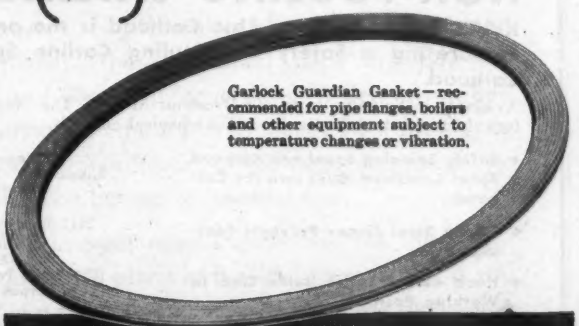

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GARLOCK *Guardian* GASKET

ft., Oswego 3,480 ft., Prue 2,515 ft., Red Fork 2,715 ft., Bartlesville 2,875 ft., Mayes 3,390 ft., Woodford 3,610 ft., Sylvan 3,610 ft., Viola 3,708 ft., dolomite 3,740 ft., Wilcox 3,762 ft.

Grant County: Gutowsky Bros. et al 1 Smith, C NE NE 36-25n-6w, dry, TD 5,607 ft., Pawhuska 2,893 ft., Hogshooter 4,732 ft., Checkerboard 4,830 ft., Oswego 5,037 ft., Prue 5,301 ft., Mississippian 5,487 ft.

Jefferson County: Reno Oil 1 Charles Pfile, NE NW NE 23-7s-6w, dry, TD 2,316 ft., sand 452-95 ft. and 580-90 ft., lime 590-95 ft., brown sand 660-65 ft., sand 990-95 ft., 1,068-1,107 ft., 1,204-31 ft., 1,295-1,335 ft. and 1,353-61 ft., hard lime 1,515-24 ft., sand 1,620-30 ft. and 1,663-66 ft., broken sands 1,786-1,800 ft. and 2,105-60 ft., sand 2,179-2,206 ft. and 2,286-99 ft.

Kay County: C. A. Leonard Estate 1 Billyeu, SE NW NW 32-28n-1e, dry, TD 1,230 ft., lime 1,033 ft. with show of gas, sand 1,226-29 ft.

Lincoln County: Herndon Drilling Co. 1 Schnelle, NW NW SE 19-17n-4e, dry, TD 4,545 ft., Hogshooter 2,787 ft., Layton 2,855 ft., Cleveland 3,103 ft., Oswego 3,567 ft., Skinner 3,753 ft., Bartlesville 3,932 ft., Mayes 4,159 ft., Woodford 4,338 ft., Misener 4,379 ft., Viola 4,450 ft., Wilcox 4,513 ft., dolomitic sand 4,520 ft.

Logan County: Wood Drilling Co. 1 Tyler, SE SW NW 7-16n-1w, dry, TD 5,933 ft., Pawhuska 2,350 ft., Avant 3,810 ft., Dewey 3,860 ft., Hogshooter 4,410 ft., Layton 4,480 ft., Checkerboard 4,670 ft., conglomerate 4,720 ft., Big Lime 5,050 ft., Oswego 5,130 ft., Prue 5,290 ft., Basal Pennsylvanian-Mississippi lime 5,380 ft., Woodford 5,440 ft., Misener 5,520 ft., Hunton 5,525 ft., Sylvan 5,570 ft., Viola 5,630 ft., Wilcox 5,830 ft., second Wilcox 5,900 ft.

Love County: J. S. Batson 1 Hamilton, SW SW NW NW 7-6s-2e, dry, TD 1,552 ft., sand 432-55 ft., 530-55 ft., 624-43 ft. and 675-700 ft.

Noble County: Edward P. Baker et al 1 Schultz, NE NE NW 34-23n-2e, dry, TD 4,512 ft., Layton 2,947 ft., Big Lime 3,440 ft., Oswego 3,540 ft., Verdigris 3,850 ft., Skinner 3,860-80 ft., pink lime 3,910 ft., Red Fork 3,945 ft., Mississippi lime and chat 4,084 ft., Woodford 4,392 ft., Ordovician 4,418 ft.

Noble County: Kingwood Oil 1 Sykora, SE SE NE 24-22n-1w, dry, TD 4,724 ft., Pawhuska 2,041 ft., Upper Hoover 2,138 ft., Lower Hoover 2,296 ft., Tonkawa 2,776 ft., Avant 3,190 ft., Layton 3,526 ft., Checkerboard 3,997 ft., conglomerate 4,007 ft., Oswego 4,088 ft., Basal Oswego 4,300 ft., Skinner 4,400 ft., Mississippi lime 4,648 ft.

Okfuskee County: J. E. Crosbie 1 Parsons, SE SE NW 17-11n-7e, dry, TD 4,834 ft., Checkerboard 1,824 ft., Oswego 2,655 ft., Prue 2,667 ft., Senora 3,123 ft., Earlsboro 3,396 ft., Inola 3,553 ft., brown lime 3,716 ft., Booch 3,823 ft., Caney 4,043 ft., Mayes 4,355 ft., Woodford 4,490 ft., Misener 4,510 ft., Sylvan 4,632 ft., Viola 4,717 ft., Wilcox 4,787 ft., second Wilcox 4,827 ft.

Pawnee County: Mid-Continent Petroleum Co. 1 Johnson, SE NE SE 6-20n-6e, dry, TD 3,326 ft., Avant 1,802 ft., Checkerboard 2,510 ft., Cleveland 2,520 ft., Lower Cleveland 2,549-90 ft., Oswego 2,720 ft., Prue 2,910 ft., Skinner 3,075 ft., Mississippian 3,323 ft.

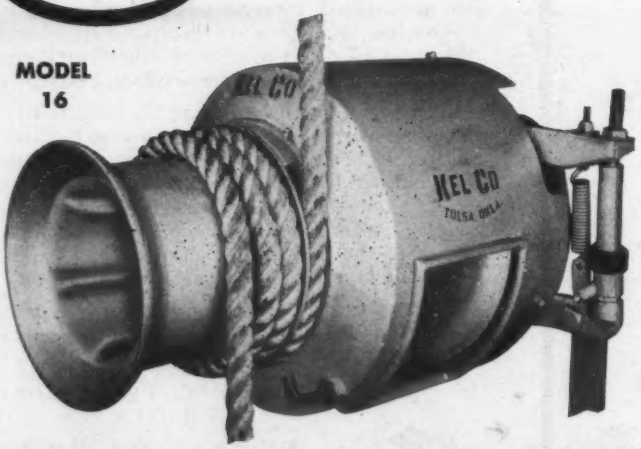
Seminole County: Ashland Oil & Refining Co. 1 Sulzberger, SE SE SW 28-10n-6e, dry, TD 3,410 ft., Checkerboard 1,940 ft., Calvin 2,590 ft., Senora 3,002 ft., Earlsboro sand 3,350-77 ft., no shows.

Seminole County: Deardorf & Norbla 1 Reed, NW NW NW 3-7n-7e, dry, TD 4,460 ft., Wapanucka 3,285 ft., Upper Cromwell 3,317 ft., Lower Cromwell 3,430 ft., Caney 3,775 ft., Mayes 3,998 ft., Hunton 4,093 ft., Sylvan 4,230 ft., Viola 4,278 ft., dolomite 4,360 ft., second Wilcox 4,448 ft.

Stephens County: W. H. Atkinson, SE SE NW 20-2s-6w, dry, TD 2,046 ft., sand 1,045-70 ft. and 1,420-39 ft., Hoxbar 1,510 ft.

KELCO Safety

MODEL 16



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EASTERN TEXAS

Anderson County Wildcat To Test Pettit Zone

DALLAS.—Sanders & Murchison 1 Broadway, prospective discovery 3 miles east of Blackfoot in Anderson County, was preparing to complete from the Pettit zone at 9,736-40 ft. and 9,750-58 ft. A test of perforations at 9,726-30 ft., and 9,740-48 ft., produced an immediate blow at the surface, but packer failed in 2 minutes and the recovery was a small amount of mud cut with distillate and gas. Before coming out of the hole with the test tool, operators circulated oil out of the casing with mud. When the tool was pulled, maximum bottom-hole flowing pressure was 3,250 psi., which increased to 4,875 psi. after being shut in 1 hour.

The Grayson County new discovery 1 mile north of Sherman, Standard Oil Co. of Texas 1 Covey-Bates Unit, was shut in after making several test flows of oil. Corrected total depth was reported at 3,792 ft., in sand. Casing was set at 3,782 ft., and when plug was drilled, the well was swabbed but it failed to kick off and flow. Shut in 11 hours, it was opened and flowed 13 bbl. of oil in 1 hour through ½-in. choke on tubing. It was shut in 30 minutes, then opened and flowed 6 bbl. of oil in 30 minutes; then 75 bbl. of oil in 12 hours, and 141 bbl. of oil a day before being shut in for completion. All flows were through ½-in. tubing choke.

In Cherokee County, northwest of Jacksonville, W. M. Coats 1 Fred Fowler had total depth at 4,965 ft. in sand and was to core ahead. A 2-ft. core recovered from 4,838-40 ft. was said to have had a faint odor of distillate in the bottom, and at

4,848-54 ft. there was a gas-distillate odor in fine to medium-gray sand.

M. S. Slagle et al 1 Southern Pine Lumber Co., a Travis Peak test 7 miles west of Mound City, Red River County, had total depth at 2,130 ft., and operators reported corrected information as follows: Cores at 2,102-10 ft. recovered 3 ft. of black shale, and 3 ft. of red shale with limestone streaks. Drilled out to 2,122 ft., then cored to 2,130 ft., the recovery was 3 ft. of hard and tight oil sand.

Two Freestone County wildcats reported little change from the previous week. Humble Oil & Refining Co. 1 R. P. McWatters, 1½ miles south of Freestone, had total depth at 4,774 ft., in sand, and was reaming ahead. A drill-stem test at 4,763-75 ft., open 4 hours, recovered 3,700 ft. of salt water. One mile southwest of Stony Point Church, The Texas Co. 1 E. L. Irvin had total depth at 8,168 ft. in limestone and was preparing to set pipe after making electrical survey. A test at 8,083-8,110 ft., using ¼-in. chokes and 1,600 ft. of water cushion, recovered only the water ballast and 30 ft. of gas-cut mud. Cores from 8,138-68 ft. had no shows.

B. G. Byars 1 Alex Jones, Paluxy test 5 miles north of Edom in Van Zandt County, reported tops on the Nacatoch at 2,360-90 ft., Pecan Gap 3,020-50 ft., Austin 4,282-4,550 ft., and log top on the Woodbine at 5,000 ft., and the Georgetown at 5,750 ft. Elevation is 456 ft. Operators were drilling ahead below 5,834 ft.

EAST TEXAS SUCCESSFUL WILDCAT

Wood County: Gas-distillate discovery, Humble Oil & Refining Co. 1 Rio Oil Corp., Jesse Walker Sur., 3¾ mi. E. Yantis, TD 8,285 ft. in Pittsburg, PB 8,231 ft., perf. 7,932-42 and 7,942-50 ft. in Gloyd, flowed 99.3 bbl. 62°-gravity distillate and 3,140,000 cu. ft. gas a day through ¼-in. choke, GOR on ¼-in. choke, 31,864:1, tubing pressure 2,739 lb., open flow potential estimated at 11,000,000 cu. ft. gas a day.

EAST TEXAS WILDCAT FAILURE

Denton County: Russell Maguire 1 E. R. Waide "A," A. H. Lynde Sur., 4 mi. N. Volivar, dry, TD 1,978 ft., Detrital 1,708 ft., Ellenburger 1,819 ft.

CALIFORNIA

New Deep Producing Zone in Del Valle Field, at 11,000 Ft.

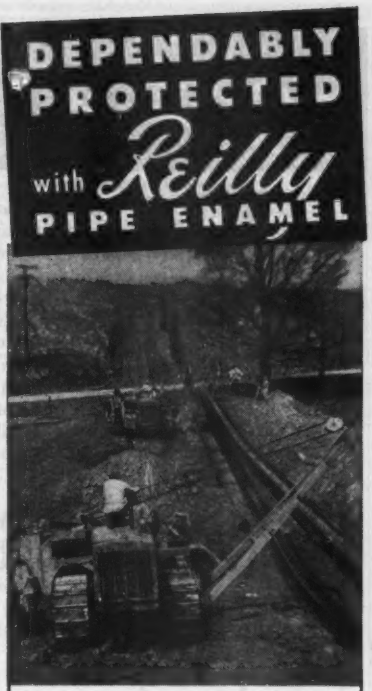
LOS ANGELES. — Discovery of a new deep producing zone in the Del Valle field of northwestern Los Angeles County has been confirmed by the completion of the R. E. Havenstrite -15 Lincoln, 16-4n-17w. This well was completed late last week flowing at an estimated rate of 400 bbl. daily through perforations opposite the interval 10,933 and 11,762 ft. Gravity of the crude and water cut have not yet been determined. Total depth of the well is 12,868 ft.

First indication of a deep discovery at the well came several weeks ago when it was reported that a thick section of well-saturated oil sand had been topped at 10,140 ft. At that time, however, operators elected to drill deeper in search of other deep horizons before making a test, and the well was carried on to present total depth without uncovering anything of interest. It subsequently was plugged back and perforated at 10,942-11,742 ft., where a formation test recovered oil at the rate of 300 bbl. per day. Further perforations at 10,100-10,300 ft. produced no results, and the well was perforated and completed in the present productive interval.

The Del Valle field, discovered in 1940, has produced previously from the Modelo sand of the upper Miocene at an approximate depth of 6,800 ft. This sand has been correlated with the "Third" zone of the neighboring Newhall-Potrero field. The other previously productive interval in the field is the probable equivalent of the "First" zone at Newhall-Potrero and is found at approximately 6,000 ft. The area in which the field is located is highly faulted, and whether or not the new zone will have the aerial extent of the two older zones will have to be determined by future drilling.

The completion gage of the 15 Lincoln is not an accurate indication of the true capacity of the well since it is relatively deep and it will be several days before the drilling mud cleans up. It is evident, however, that Havenstrite has found new deep production and paved the way to new drilling in the area.

Seaboard Oil Co.'s third well in the Bacon Hills area is reportedly drilling ahead below the 8,050-ft. mark with the Oceanic oil sand expected somewhere within the next 50 ft. of hole. This well, the 24-21 Seaboard-Bandini, 21-28s-20e, will determine the importance of Seaboard's discov-



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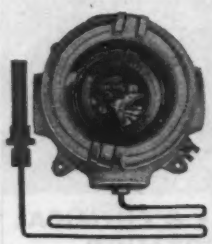

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ery in the area earlier this year. The discovery well, 3-21 Seaboard-Bandini, was completed in April for 500 bbl. daily but subsequently was killed to effect a water shutoff. When restored to production it produced at a rate of only 150 bbl. daily. The second well, 24-21 Seaboard-Bandini, also failed as a major producer but results justified drilling a third well.

Western Gulf Oil Co.'s deep test in the Sand Hills area of Kern County, the 1 Southern Pacific, 25-12n-20w, has been halted at a depth of 15,092 ft. by stuck drill pipe. Operations are now concentrated on efforts to pull the pipe so that the drilling may be resumed.

Oceanic Oil Co. announced last week that it is starting a shallow wildcat in the Kern Bluff area of Kern County to test the Santa Margarita-Kern River sand. The test will be known as 1 Needham-Bloemer and location will be in 7-29s-29e. The sand to be explored by this venture was found to be productive in the area by a Shell Oil Co. wildcat drilled to a depth of 1,143 ft. about 3 years ago. The Shell well produced only a small amount of oil, however, before being abandoned.

CALIFORNIA WILDCAT FAILURES

Los Angeles County, Alondra area: H. C. Christie 1 Johnson, 22-3s-14w, dry, TD 9,351 ft.

Monterey County, Los Lobos area: The Texas Co. 1 Orradre, 31-23s-11e, dry, elev. 575 ft., TD 3,795 ft.

Yolo County, Winters area: Shell Oil Co., Inc. 1 Heinz Unit, 20-8n-1e, dry, elev. 110 ft., TD 5,300 ft.

TEXAS GULF COAST

New Gas-Condensate Field Opened by 1 J. R. Farmer

HOUSTON.—A new gas-condensate field was opened by Jack W. Frazier and Grubb & Hawkins 1½ miles northeast of Clodine, Fort Bend County. The well, 1 J. R. Farmer, was drilled to a total depth of 7,665 ft., and the 6-in. casing is cemented to 7,635 ft. and perforated in two sections, 7,559-63 ft. and 7,578-82 ft. for completion. The test is flowing gas and condensate with no gage reported.

Dan Auld et al 1 F. W. Heinrich, discovery well for the Heinzeville condensate pool, located in Cyrus Donnelly Survey, 3 miles northwest of Weesache, on potential gage flowed 3,200,000 cu. ft. of gas per day and 108 bbl. of condensate per day through a ¼-in. choke, tubing pressure 1,490 psi., no water. Production is from the Slick sand perforated at 7,560-66 ft.

A new condensate pay for La Salle pool in Jackson County has been opened by Sterling Oil & Refining Co. 1-Y J. M. Bennett, and on initial test flowed 65 bbl. of condensate per day through a ¼-in. choke, tubing pressure 2,400 psi., casing pressure 2,500 psi., gravity 51°. Total depth is 7,720 ft., and production is through perforations at 6,298-6,314 ft.

In Calhoun County, 2 miles northeast of Sheriff field, and 3 miles west of Port Lavaca field, Quintana Petroleum Corp. 1 L. J. Foester, in Y. Benavides Survey, opened a new condensate pool. Top of pay 7,920 ft., with total depth at 10,064 ft. On initial test the well gaged 4,000,000 cu. ft. of gas per day through a ¼-in. choke, with considerable condensate.

There were 26 new locations reported this week, 3 being wildcats, 1 each in Brazoria, Calhoun and Chambers counties. Twelve exploratory tests were completed, four successful and eight dry. Two of the successful tests are in Calhoun and 1 each in Goliad and Jackson counties, while the dry wildcats are located one each in Bee, Chambers, DeWitt, Goliad, Hardin, Jackson, Victoria, and Walker counties.

TEXAS GULF COAST SUCCESSFUL WILDCATS

Calhoun County: New condensate discovery—Cecil H. McSpadden 1 Mary R.

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Goggans, in Benito Morales Sur., 7 mi. SE of Port Lavaca, TD 6,220 ft., perf. 5,766-70 ft., IP: 30,000,000 cu. ft. gas per day on open flow, gas-condensate ratio 80,000, SIP 2,090 psi., gravity 62.5°, no water.

New condensate discovery: Quintana Pet. Corp. 1 L. J. Foester, Y. Benavides Sur., 2 mi. NE of Sheriff field, 3 mi. W of Port Lavaca field, top pay 7,920 ft., TD 10,064 ft., perf. 7,920-41 ft., IP: 4,000,000 cu. ft. gas per day through a ¼-in. choke, with considerable condensate, TP 2,835 psi., SIP 3,015 psi., no water.

Goliad County: New condensate discovery, Heinzeville field—Dan Auld et al 1 F. W. Heinrich, in Cyrus Donnely Sur., 3 mi. NW of Weesache, top pay 7,556 ft. (Slick sand), TD 7,774 ft., perf. 7,560-66 ft., IP: 3,200,000 cu. ft. gas, 108 bbl. per day condensate through ¼-in. choke, TP 1,490 psi., no water.

Jackson County: New condensate pay, La Salle field—Sterling Oil & Refining Co. 1-Y J. M. Bennett, in Ramon Musquez Gr., TD 7,720 ft., perf. 6,288-6,314 ft., IP: 65 bbl. per day condensate through ¼-in. choke, TP 2,400 psi., CP 2,500 psi., gravity 51°, no water.

TEXAS GULF COAST WILDCAT FAILURES

Bee County: Magnolia Pet. Co. 3 W. E. Erp, in N. Recendes Gr., 9 mi. W of Pettus, dry, TD 3,300 ft.

Chambers County: Kirby Pet. Co. 1 Kirby Pet. Co. fee, Tr. 8, Chambers Co. Sch. Ld. Sur. 3, 2½ mi. SE of Mt. Belvieu, dry, TD 8,000 ft.

DeWitt County: Stanolind 1 L. T. Burns, in James Clark Sur., 2 mi. NE of Edgar, dry, TD 9,019 ft.

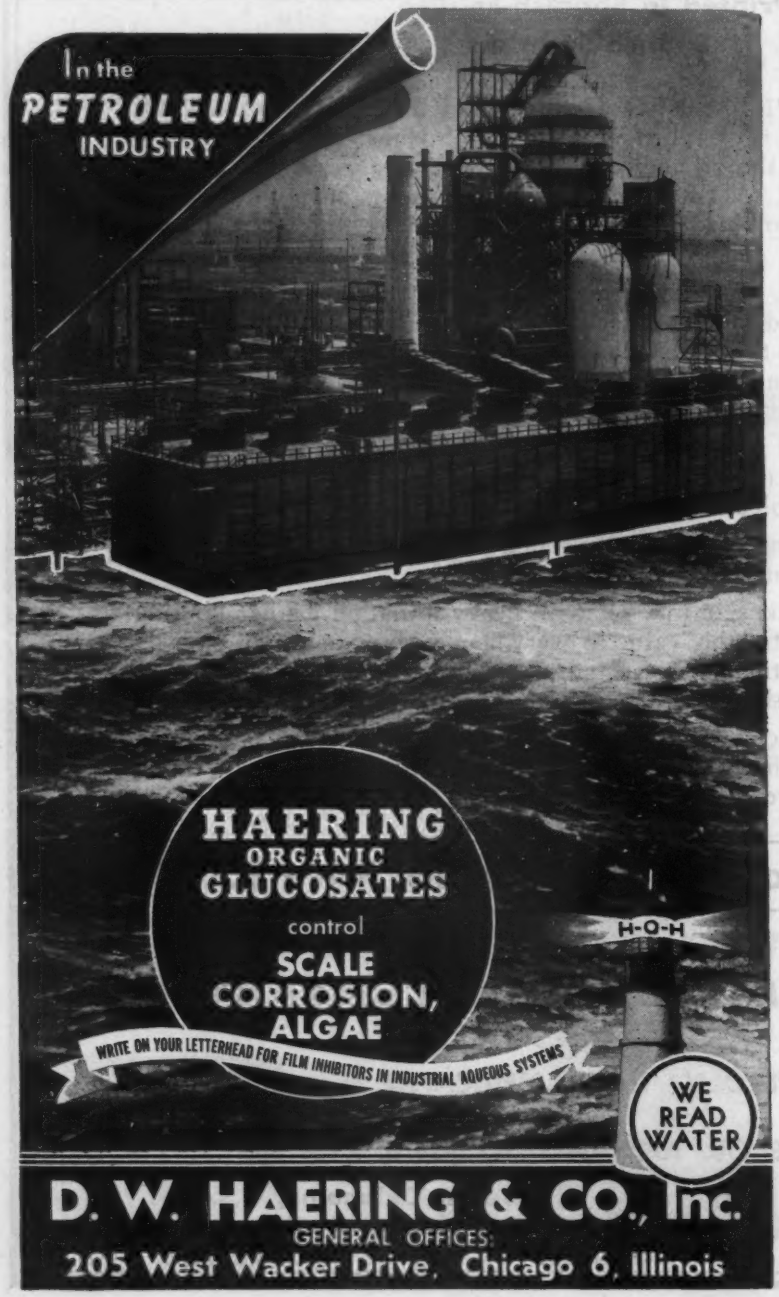
Goliad County: H. R. Smith and W. C. McBride, Inc. 1 Abraham Garza, 2 mi. W of Charco, dry, TD 9,024 ft.

Hardin County: American Republics Corp. 1 J. H. Barnett and W. B. Carroll, in Alex Hampton Lge., 4,500 ft. SSW 1 Hampton discovery well, dry, TD 8,303 ft.

Jackson County: Humble 1 E. C. LaBauve et al, in Hugh McGuffin Sur., 7½ mi. S of Lolita, dry, TD 10,080 ft.

Victoria County: A. W. Crosby, Inc. 1 A. R. McGehee, A. Waldemeyer Sur., 5 mi. N of Telferner, dry, TD 4,751 ft.

Walker County: Gar-Flo Oil Co. 1 Gabe Smither's Est., Wm. Robinson Sur., 9½ mi. SW of Sam Houston field production, dry, TD 3,019 ft.



CANADIAN FIELDS

New Leduc Well Seen As Field's Best Producer

CHATHAM, Ont.—Extending Leduc field more than a mile to the northwest, Globe-Leduc West 2, LSD 9, 34-50-26w4, is being brought in this week as probably the largest producer yet completed.

The test got the Devonian at 4,330 ft., 65 ft. lower than Imperial 3, the highest in the field. In the middle D-2 zone it gave gas at the rate of 500,000 cu. ft. daily with a 540-ft. rise of clear oil.

Drilling was continued, and a drill-stem test in the D-3 horizon at 5,236-51 ft. gave initial flow at the rate of 900,000 cu. ft. daily, increasing to 3,100,000 cu. ft. and settling to 2,900,000 cu. ft.

The hole was deepened to 5,284 ft. when another test showed a flush of 80 bbl. an hour. The previous high in other wells was around 70 bbl. Casing has been cemented, and plug drilled out for a definite test.

Globe-Leduc West 1, LSD 6, 19-50-26w4, encountered unusual porosity in the first zone, usually not commercial, and is making a drill-stem test at 4,590-4,601 ft. Location is 3 miles west of the proved field. Globe-Leduc West 3 has been spotted in LSD 10, 34-50-26w4, a quarter mile west of the No. 2 producer.

Leduc Consolidated 1, LSD 10, 23-50-26w4, to the east of the field, blew wide open with a gas flow estimated in excess of 10,000,000 cu. ft. while making a drill-stem test at 5,054 ft. This is the largest gas flow yet encountered, and may come from a higher level. Control equipment was installed to permit completion of the test.

Leduc Consolidated 2, LSD 7, 23-50-26w4, is in the D-1 zone below 4,585 ft. after getting Devonian contact around 4,380 ft. Leduc Consolidated 3, LSD 15, 23-50-26w4, is below 4,401 ft. and slightly above the Devonian. Homestead-Yaremk 1, LSD 7, 19-50-25w4, outpost test to the east, is below 4,636 ft. and logging closely with the producing wells, with Devonian at 4,335 ft. Southeast of the field, New Ranchmen's-Community 1, LSD 7, 11-49-25w4, is below 4,441 ft.

Imperial 8, LSD 7, 26-50-28w4, is below 5,295 ft., coring and testing in the D-3 zone with good indications of production. Four other Imperial tests are drilling, and Imperial 15 has spudded in LSD 7, 21-50-26w4.

Leduc deep test.—East of Imperial-Leduc 3 producer, B. A. Pyrcz 1, LSD 12, 25-50-26w4, is to be continued as an exploratory test of the deeper formations after encountering water in the third porous zone of the Devonian. British-American Oil and several major and independent companies are making bottom-hole contributions to assist in determining the possibilities of the field. Present plans call for a 7,000-ft. test, but if this does not get commercial production, consideration will be given to continuing to the granite at between 8,500 and 9,000 ft. If carried to the granite, the well, in addition to previously untested Devonian horizons, will drill through the potentially petroliferous Silurian, Ordovician and Cambrian formations.

Millet.—An important test outlying Le-

duc field to the southeast, Millet-Leduc 1, LSD 16, 6-48-24w4, is below 4,500 ft. with Devonian expected around 4,600 ft. Some gas and oil indications were met in Cretaceous formations, and production is expected around 5,600 ft.

Ram River.—In the Ram River-Clearwater area of the Central foothills, Ram River Oils 4, LSD 9, 36-34-10w5, bottoming in Devonian at 1,460 ft., is bailing after first 800-gal. acid treatment, and bringing up considerable light crude. It will be cleaned out and reacidized. Ram River 3, LSD 12, 1-37-11w5, is redrilling below 4,316 ft.

Jumping Pound.—After encountering crude-oil showings and a substantial wet-gas flow in the Madison limestone, Shell Oil 5-7-1, LSD 5, 7-25-4w5, encountered salt water in the Devonian limestone, contacted at 12,229 ft. In a drill-stem test of porosity at 12,484-652 ft., water rose 3,000 ft. The test has resumed drilling, deepening below 12,673 ft.

Steveville.—In Steveville - Princess field, Federal Oils 1, LSD 7, 8-19-11w4, finished at 3,346 ft., had initial production of 77 bbl. with ⅛-in. choke. Princess Brooks Syndicate C.P.R. 3, LSD 3, 36-18-12w4, has been abandoned at 3,545 ft.

Foremost.—In the Foremost-Pakowki area, southern Alberta, McColl-Union 7-C-3-3-10, LSD 7, 3-3-10w4, has finished at 2,001 ft. with 6,750,000 cu. ft. from the Bow Island sand. McColl-Union 7C-31-3-6, LSD 7, 31-3-6w4, has been abandoned at 2,290 ft. One test is drilling with two new locations.

Turner Valley.—In North Turner Valley, Home-Millarville 25, LSD 3, 33-20-3w5, with Madison at 8,175-8,756 ft. has 661 bbl. initial production. Five other tests are drilling.

Dina.—In the Dina area, potential southerly extension to Lloydminster field, Highwood-Dina 1, LSD 9, 12-45-1w4, finished at 1,659 ft., has 80-bbl. initial production.

Lloydminster.—In the Alberta section, Command-Yorkton 1, LSD 2, 6-50-1w4, finished at 1,939 ft., showed 800 ft. rise of oil.

OHIO, KENTUCKY

Development Continuing in Muskingum County Pool

COLUMBUS.—The Frazier pool in Brush Creek Township, Muskingum County, continues to be enlarged with good wells. The reserves for the pool have not yet been computed, as little gas has been taken from the wells, but the recovery is expected to be satisfactory.

The latest completion, Salem Petroleum 2 Hattie Stockdale, extends the pool a location southwest. Clinton sand was found at 3,664-3,705 ft. with a natural open flow of 3,108,000 cu. ft.

In Sego pool in Madison Township, Perry County, W. H. Atha 2 fee, Section 27, came in with only a small show of oil, but when shot made 63 bbl. in 24 hours. Clinton sand was reported at 3,316-78 ft. John Morrow et al 3 Lizzie Henderson, Section 28, flowed 60 bbl. the first day, after shot, along with 500,000 cu. ft. gas.

J. W. Watson et al drilled in the second large Clinton sand well in the Sayre pool in Perry County. The completion was 3 Jesse J. Ketham, Section 27, Bearfield Township, which came in with an open flow of 2,393,000 cu. ft., natural, from sand at 3,913-40 ft. Across the line in Pleasant Township, the Charles Beatrice 1 Minnie Beatrice, Section 28, was shut in at 1,000,000 cu. ft. after shooting the Medina sand.

National Gas 3 Frank Rambo, Section 22, York Township, Morgan County, was drilled in with a good showing of oil in the Clinton sand at 3,758-89 ft. In the first 24 hours after shot the well flowed 50 bbl. through a trap against 50-psi. pressure.

Stark County again leads in new starts with 11, followed by Morgan County with 4, Licking 3, and Monroe 2. Completions continue at a fast rate with 28 for the week. Stewart field led with seven, followed closely by Sandyville and Cambridge with six each.

WESTERN KENTUCKY

OWENSBORO.—George S. Engle 1 J. A. Dixon, 2-L-24, Websted County, opens a new pool in Tarr Springs pay 6 miles from nearest production. The well made 146 bbl. of oil by swabbing from Tarr Springs at 2,546-72 ft. After deepening to 2,580 ft. well swabbed 390 bbl. oil per day. Lower Kincaid was logged at 2,156 ft., Menard at 2,411 ft., and Viola at 2,486 ft.

George E. Engle 2 J. A. Dixon, 2-L-24, is waiting on cement with pipe set at 2,530 ft. Tarr Springs was logged at 2,532-63 ft., with good saturation from 2,543-63 ft. The same operator's 3 J. A. Dixon, 2-L-24, found two saturated zones in Pennsylvanian. Drill-stem test at 1,710-20 ft. recovered 20 ft. oil and 120 ft. oil-cut mud. Saturation at 2,140-50 ft. was not tested. Drilling is being continued with tools below 2,255 ft.

WESTERN KENTUCKY WILDCAT FAILURE

Webster County: Gilliam Drilling Co. 1 J. W. Johnson, 11-N-23, dry at 2,693 ft., Glen Dean 1,922 ft., Barlow 2,189 ft., Ste. Genevieve 2,470 ft.

WESTERN KENTUCKY SUCCESSFUL WILDCAT

Hopkins County: O. O. Borden et al 1 O. C. Whitfield, SE SE 1-K-25, IP 3 bbl., Tarr Springs pay 2,300-20 ft., TD 2,320 ft.

EASTERN KENTUCKY

ASHLAND.—A well producing in excess of 2,000,000 cu. ft. highlighted the week's activity in the eastern Kentucky field of operations. Kentucky-West Virginia Gas Co. No. 852 on the Robert Williams property marked at 2,957 ft. and made 2,822,000 cu. ft. natural in the shale. A dry hole was registered by the same company in Well

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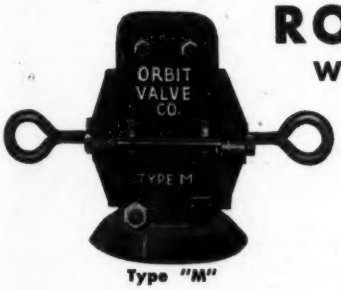

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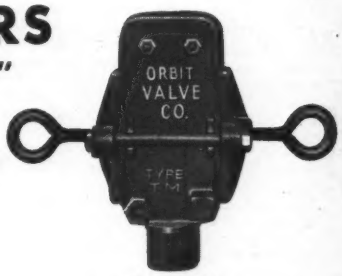

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No. 859, Hiram Slone and others, Floyd County, at 3,406 ft.

One location was noted in Well No. 5770, Henderson Hall, Floyd County, by Kentucky-West Virginia.

INDIANA

EVANSVILLE.—On the southeast side of Keensburg Consolidated pool, about ½ mile from production, Cummings Oil Co. 3 Fifer heirs, SW SW NW 36-3s-14w, Posey County, made 240 bbl. oil in 24 hours on pumping test of McClosky at 3,110-14 ft. Well has not been acidized.

Gulf Refining Co. has completed 1 E. Mackey, NW NE SE 9-8s-14w, Posey County, in McClosky pay at 2,648-52 ft. and 2,698-2,702 ft. Initial gage is 18 bbl. oil and 34 bbl. water. Well was treated with 500 gal. acid. This test is about 1 mile west of College pool, which produces from Aux Vases and McClosky.

The new Evansville pool, opened by Calvert and Willis et al 1 Egli, NE SW SW 2-6s-11w, Vanderburgh County, in Pennsylvanian pay, now has five completed wells, each making from 161 to 212 bbl. oil per day.

INDIANA SUCCESSFUL WILDCAT

Posey County: Gulf Refining Co. 1 E. Mackey, NW NE SE 9-8s-14w, McClosky pay 2,648-52 ft. and 2,698-2,702 ft., IP 18 bbl., TD 2,705 ft.

INDIANA WILDCAT FAILURE

Spencer County: R. Hal Compton 1 Schwartz, NE NW 7-6s-3w, dry at 796 ft., Upper Glen Dean 390 ft., Golconda 446 ft., Barlow 570 ft.

ILLINOIS

West Johnsonville Pool Getting Good Well

MATTOON.—Puritan Drilling Co. et al 1 Hawkins, SW SW NW 24-1n-5e, Wayne County, has pipe set on good oil saturation found in Aux Vases from 2,946 to total depth at 2,956 ft. Drill-stem test recovered gas in 70 minutes and 2,000 ft. of clean oil, free of water at the end of 2 hours. This test is 4 miles southwest of Johnsonville, and on the northeast side of the West Johnsonville pool.

Also in Wayne County, Tuley and Carter 1 Martin heirs, NW 4-2s-8e, an exploratory test about 2 miles east of the Boyleston Consolidated pool, on drill-stem test at 3,181-91 ft. in Aux Vases, recovered 2,771 ft. gas and 10 ft. of clean oil.

George and Wrather Drilling Co. 1 Minnie Leaf, Richland County, on the north side of the East Olney pool, is testing McClosky lime pays at 3,068-71 ft. and 3,074-76 ft. Drill-stem test recovered gas in 32 minutes, 210 ft. of clean oil, and 30 ft. of oil-cut mud.

Paul Doran 1 Manning, NE NW SW 14-11n-4e, Shelby County, swabbed 72 bbl. oil and 37 bbl. water per day after shooting Aux Vases at 1,860-80 ft. with 20 qt. Well is being put on pump to test.

Exploratory tests include two rank wildcats, one in Montgomery County and one in Jefferson County. Benoist and Forsythe 1 Panama Coal Co., NE NE SW 11-7n-4w, Montgomery County, is rigging up standard tools. George and Wrather 1 Lenkford, SE SW SE 21-4s-4e, is a location.

Two and one-half miles north of the Louden pool, Burke-Ryan et al 1 Morris, NW NE NW 12-9n-3e, Shelby County, is drilling below 743 ft. Two miles southeast of the Inman pool, Sohio Oil Co. et al 1 Logsdon, SE NE NW 5-9s-10e, Gallatin County, is drilling below 800 ft. Two and one-half miles southeast of the Boyd pool in Jefferson County, Reward Oil Co. 1 Trout, NE NE SE 5-2s-2e, is drilling below 2,175 ft. Glen Dean was topped at 1,830 ft. and Benoist at 2,162 ft.

ILLINOIS WILDCAT FAILURE

Edwards County: Superior Oil Co. 1 Nellie Frost, SW SE NW 32-2n-10e, dry at 3,388 ft., Glen Dean 2,686 ft., Barlow 2,888 ft., Ste. Genevieve 3,248 ft.

LEGAL

SALE OF OIL AND GAS MINING LEASES TRIBAL AND ALLOTTED INDIAN LANDS
Department of the Interior, Wind River Indian Agency, Fort Washakie, Wyoming, August 25, 1947

Notice is hereby given that **SEALED BIDS** will be received until 1:45 P.M., September 24, 1947, at the Wind River Agency, Fort Washakie, Wyoming, for the leasing of the following parcels of tribal and allotted trust lands located in Fremont County, Wyoming, for oil and gas mining purposes:

UNIT NO. 1 Tribal Land: All interest in Lots 3 and 4 (W½ SW¼), E½ SW¼ and SE¼ of Section 19; SW¼ SW¼ of Section 20; W½ and SE¼ of Section 29; Lots 1 and 2 (W½ NW¼), Lot 3 (NW¼ NW¼), E½ W½ and E½ of Section 30; NE¼ NE¼ of Section 31; N½ of Section 32; all in Township 7 North, Range 1 East, W.R.M., and S½ of Section 24; NW¼ and E½ NE¼ of Section 25; in Township 7 North, Range 1 West, W.R.M., containing 2,351.44 acres.

UNIT NO. 2 Allotment No. 265-C. An undivided ½ interest in the W½ NE¼ of Section 25, Township 7 North, Range 1 West, W.R.M., containing 80 acres.

Unit No. 1 is tribal land and a lease therefor will be drawn on the applicable form. Unit No. 2 is allotted land and is being offered subject to approval of the individual Indian owners and a separate lease will be drawn on the applicable form for allotted land. Special attention is invited to the fact that this unit of allotted land is being offered with the understanding that the lease to be issued therefor will cover only 50 per cent of the oil and gas mineral rights. The remaining one-half interest of the mineral rights for this 80 acre tract is held in fee and therefore is not under the jurisdiction of this Office. The right is reserved to reject any and all bids. Bids may be made on one or both of the described units. The successful bidder or bidders will be required to pay the cost of advertising, such cost to be prorated if there is more than one successful bidder.

The leases will be sold to the highest bidder for a bonus offer upon an acreage basis in addition to the royalty of 12½%. The successful bidder or bidders must enclose with their bids, a certified check or bank draft drawn on a solvent bank in an amount equivalent to at least 20% of the bonus bid plus 20% of the first year's rental at the rate of $1.25 per acre per annum, as a guaranty of good faith. The checks are to be made payable to the TREASURER OF THE UNITED STATES. The bonus offered for the undivided ½ interest in Unit No. 2 of allotted land shall be upon a per acre basis for the entire 80 acres. However, the rental on the undivided ½ interest of the 80 acres will be only half of the prescribed rate of $1.25 an acre, or a total annual rental of $50. The leases must be completed and filed with this Office within twenty (20) days from the date they are received by the lessee for execution and accompanied by payment of the remainder of the bonus bid, the balance of the first year's rental and a filing fee of $5.00 for each separate lease. Failure in any of these conditions may subject the bid to cancellation without further notice and forfeiture of payments already made.

The lessee will be required to use diligence in drilling and producing operations and the lessee alone or in conjunction with other lessees in this area shall commence the drilling of a test well within one year from date of approval of the lease and diligently continue drilling to test to the satisfaction of the Geological Survey the oil producing possibilities of the Madison formation, unless oil or gas in commercial quantities is found at a lesser depth or the Geological Survey shall determine that further drilling in the well would not be warranted.

The lease for Unit No. 1 of tribal land will be issued pursuant to the Act of May 11, 1938 (52 Stat. 347), and the regulations approved May 31, 1938, Title 25, Code of Federal Regulations, Part 186, as amended. The lease on Unit No. 2 of allotted land will be issued pursuant to the Act of March 3, 1909, (35 Stat. 783), and in accordance with the Departmental regulations approved October 8, 1937, Title 25, Code of Federal Regulations, Part 189, as amended. The leases issued pursuant to this notice covering both tribal and allotted lands will be made for a term of ten years from the date of approval by the Commissioner of Indian Affairs, and as long thereafter as oil and/or gas is produced in paying quantities. The rate of royalty will be 12½% of the value of all oil, gas, and/or natural gasoline unless the lessor with the approval of the Commissioner of Indian Affairs elects to take royalty in kind. The adequacy of the bonus offers will be determined by the Geological Survey. Lessees shall furnish a surety bond. The responsibility of complying with any requirements of the Federal Documentary Stamp Statutes will be left with the successful lessees.

All bids should be addressed to the Superintendent, Wind River Agency, Fort Washakie, Wyoming, in an envelope plainly marked: BIDS FOR OIL AND GAS MINING LEASE, MADDEN FIELD, TO BE OPENED 1:45 P.M., SEPTEMBER 24, 1947. For further information call or write Mr. Waller, Land Division of the Wind River Agency. J. M. COOPER, Superintendent.

LEGAL

SALE OF OIL AND GAS MINING LEASES TRIBAL INDIAN LANDS
Department of the Interior, Wind River Indian Agency, Fort Washakie, Wyoming, August 25, 1947

Notice is hereby given that **SEALED BIDS** will be received until 2:00 P.M., Wednesday, September 24, 1947, at the Wind River Agency, Fort Washakie, Wyoming, for the leasing of the following parcels of Tribal lands, located in Fremont County, Wyoming, for oil and gas mining purposes:

UNIT NO. 1. All interest in the S½ SW¼ and SW¼ SE¼ of Section 22; N½ NW¼, NW¼ NE¼, S½ NE¼ and N½ SE¼ of Section 27, all in Township 6 North, Range 3 West, W.R.M., containing 400 acres.

UNIT NO. 2. All interest in the E½ of Section 35 and W½ of Section 36, Township 6 North, Range 3 West, W.R.M., containing 640 acres.

UNIT NO. 3. All interest in the W½ W½ of Section 25; E½ and E½ W½ of Section 26, Township 6 North, Range 3 West, W.R.M., containing 640 acres.

UNIT NO. 4. All interest in the SE¼ and E½ W½ of Section 25, Township 6 North, Range 3 West, W.R.M., containing 320 acres.

UNIT NO. 5. All interest in the NE¼ NE¼ of Section 36, Township 6 North, Range 3 West; Lots 1, 2, 3, and 4 (W½ W½), Lots 6 and 7 (S½ SE¼), NE¼, N½ SE¼, E½ NW¼ and NE¼ SW¼ of Section 31, Township 6 North, Range 2 West, W.R.M., containing 649.52 acres.

UNIT NO. 6. All interest in the SE¼, S½ NE¼ and NW¼ NE¼ of Section 36, Township 6 North, Range 3 West; Lots 1, 2, 3 and 4 (N½ N½), and S½ N½ of Section 1; Lot 1 (NE¼ NE¼) of Section 2, Township 5 North, Range 3 West, W.R.M., containing 640.89 acres.

UNIT NO. 7. All interest in Lots 4, 5, 6 and 7 (W½ W½) of Section 6; Lot 1 (NW¼ NW¼) of Section 7, Township 5 North, Range 2 West; SE¼ SE¼ of Section 2; N½ NE¼ of Section 12; SE¼ and N½ SW¼ and an undivided ½ interest in S½ SW¼ of Section 1, Township 5 North, Range 3 West, W.R.M., containing 635.82 acres.

UNIT NO. 8. All interest in Lot 4 (SW¼ SW¼)of Section 7, E½ NW¼ and SW¼ NE¼ and an undivided ¼ interest in Lots 1 and 2 (W½ NW¼) of Section 18, Township 5 North, Range 2 West; All interest in the SE¼, E½ SW¼, S½ NE¼, and W½ NW¼ and an undivided ½ interest in the E½ NW¼ of Section 12, Township 5 North, Range 3 West, W.R.M., containing 717.72 acres.

Separate leases will be drawn on the applicable Government form for each of the described eight units. Bids may be made on one or more of the described units. The right is reserved to reject any and all bids. The successful bidder or bidders will be required to pay the cost of advertising, such cost to be prorated if there is more than one successful bidder.

The leases will be sold to the highest bidder for a bonus offer upon an acreage basis in addition to the royalty of 12½%. The successful bidder or bidders must enclose with their bids, a certified check or bank draft drawn upon a solvent bank in an amount equivalent to at least 20% of the bonus bid plus 20% of the first

year's rental at the rate of $1.25 per acre per annum, as a guaranty of good faith. The checks are to be made payable to the TREASURER OF THE UNITED STATES. The bonus offered for the undivided ½ interest in the one tract of Unit No. 7, viz: (S½ SW¼, Section 1, Township 5 North, Range 3 West, containing 80 acres) and for the undivided ½ interest in the two tracts of Unit No. 8, viz: (Lots 1 & 2, Section 5 North, Range 2 West, and E½ NW¼, Section 12, Township 5 North, Range 3 West, containing 158.56 acres, more or less) shall be upon a per acre basis for the entire 238.56 acres. However, the rental for these three tracts of undivided ½ interests will be only half of the prescribed rate of $1.25 an acre or at the rate of 62½c per acre per annum. The leases must be completed and filed with this Office within 20 days from the date they are received by the successful bidder for execution and accompanied by payment of the remainder of the bonus bid, the balance of the first year's rental and the filing fee of $5.00 for each separate lease. Failure in any of these conditions may subject the bid to cancellation without further notice and forfeiture of payments already made.

The lessee will be required to use diligence in drilling and producing operations and the lessee alone or in conjunction with other lessees in the Dry Creek-Sheldon Dome area shall commence the drilling of a test well within one year from date of approval of the lease and diligently continue the drilling of such well to test to the satisfaction of the Geological Survey the oil and gas possibilities of the Tensleep formation, unless oil or gas in commercial quantities is found at a lesser depth or the Geological Survey shall determine that further drilling in the well would not be warranted.

The lease or leases issued as a result of this sale will contain the usual unit operation stipulation to the efect the lessee will within 30 days of demand subscribe to and operate under such reasonable cooperative unit plan for the development and operation of the area, field or pool embracing the lands included herein as the Secretary of the Interior may determine to be practicable or necessary and advisable to adequately protect the rights of all parties in interest, including the United States.

The leases to be issued for the described eight units of Tribal land will be made for a term of 10 years from date of approval by the Commissioner of Indian Affairs and as long thereafter as oil and/or gas is produced in paying quantities in accordance with the provisions of the Act of May 11, 1938, (52 Stat. 347), and the regulations approved May 31, 1938, Title 25, Code of Federal Regulations, Part 186, as amended. The rate of royalty will be 12½% of the value of all oil, gas, and/or natural gasoline unless the lessor, with the approval of the Commissioner of Indian Affairs elects to take royalty in kind. The adequacy of the bonus offers will be determined by the Geological Survey. A suitable bond will be required and such bond must be approved by the Department. The responsibility of complying with any requirements of the Federal Documentary Stamp Statutes will be left with the successful lessees.

All bids should be addressed to the Superintendent, Wind River Agency, Fort Washakie, Wyoming, in an envelope plainly marked: BID FOR OIL AND GAS MINING LEASES, NORTHWEST SHELDON DOME FIELD, TO BE OPENED 2:00 P.M., SEPTEMBER 24, 1947. For further information call or write Mr. Waller, Land Division of the Wind River Agency.

J. M. COOPER, Superintendent.

LEGAL

CALL FOR BIDS.—To sell royalty crude oil accruing to the United States. Sealed bids, in duplicate, will be received in the office of the Director of the Geological Survey, Room 5244 Federal Works Agency Building, Washington 25, D.C., on or before noon, d.s.t., September 16, 1947, and publicly opened at 2:00 p.m., d.s.t., on that day, for the sale of certain royalty crude oil accruing to the United States from Federal lands in the Bronson, Eaves, Eunice - Monument, Grayburg - Jackson, Maljamar, and Rhodes pools, all in Eddy and Lea Counties, New Mexico. No bid received after the time fixed herein for submitting bids will be considered. Contracts for the royalty oil will be for a term of 3 years beginning the first day of the calendar month following execution by the Secretary of the Interior. The monthly royalty oil accruals offered for sale under seven items are approximately as follows: 1,400 barrels from the Bronson pool; 2,160 barrels from the Eaves pool; 14,900 barrels from the Eunice-Monument pool; 970 barrels of unitized and 9,100 barrels of nonunitized oil from the Grayburg-Jackson pool; 14,600 barrels from the Maljamar pool; and 3,000 barrels from the Rhodes pool. Specifications on the quantities of crude oil offered for sale, the form of bids, the form of contract, and the conditions with respect to bond requirements, deliveries, volume measurements, gravity determinations, and other details relating to the call for bids may be obtained from the Director, Geological Survey, U.S. Department of the Interior, Washington 25, D.C., or the Oil and Gas Supervisor, U.S. Geological Survey, P.O. Box 997 (332 Federal Building), Roswell, New Mexico. Sealed bids must be submitted to the Director of the Geological Survey, U.S. Department of the Interior, Washington 25, D. C., pursuant to the specifications, the envelope to be marked plainly "Bid on New Mexico Royalty Oil, not to be opened before noon, d.s.t., September 16, 1947." Dated August 14, 1947. Oscar L. Chapman, Under Secretary of the Interior.

Federal Land Bank Offers Mineral Interests for Sale

The Federal Land Bank of New Orleans and the Federal Farm Mortgage Corp. are offering for sale their nonproducing mineral interests and royalty rights in 1,100,000 mineral and royalty acres under 2,200,000 surface acres in Louisiana, Mississippi, and Alabama, R. L. Thompson, president of the Federal Land Bank, has announced.

Because of the current activity in minerals and the recent development of new gas and oil fields in the area, land bank officials expect the sale to draw wide interest throughout the country. In explaining acquisition of minerals by the bank, Thompson said, "The bank acquired around 2,000,000 acres of land, largely during depression years, through the unwilling foreclosure of mortgaged farms. In selling these distressed farms, which generally were sold below the amount of debt on them, the land bank retained a portion of the mineral rights in the hope of recovering the losses sustained."

Sealed bids will be submitted through the trust department of the Whitney National Bank of New Orleans until November 18. Complete information on the holdings can be obtained upon request to the Federal Land Bank of New Orleans.

N.L.G.I. Board to Meet

H. P. Hobart, Gulf Oil Corp., Pittsburgh, president of the National Lubricating Grease Institute, has called a meeting of the institute's board of directors September 19 at the Hotel Traymore, Atlantic City, N. J. Matters on the agenda for the meeting include final arrangements for the fifteenth annual N.L.G.I. convention scheduled for the Edgewater Beach Hotel, Chicago, October 16-18, and election of a new member of the board to fill the unexpired term of L. C. Welch, Standard Oil Co. (Ind.), retired.

Burbank Oil Operators Plan Recovery Program

Oil operators in the North Burbank field in Osage County, Oklahoma, have asked the Osage Indian Council to accept a reduction in royalties in return for a water-flooding secondary-recovery program which would possibly produce 160,000,000 bbl. in the next 25 years.

William Heith, formerly of the Phillips Petroleum Co., has been named by the Osage Council as a consultant engineer to study the proposal.

Cost of the proposed program has been estimated at $45,000,000, spread over a period of 10 to 15 years. The amount of royalty reduction was not specified by the operators.

Indiana Standard Unit Gets Safety Recognition

The manufacturing department of Standard Oil Co. (Ind.) has been awarded a certificate of honor by the Joseph A. Holmes Safety Association, industry-sponsored organization, for reducing its accident-frequency rate for 1946 to 37 per cent below that of 1945.

Accident-frequency rate for the year in that department was 1.15 per million man hours worked, compared with 1.84 in 1945. A total of 10,948 employes worked 20,916,822 man hours during the year in the department.

Jersey Standard Makes New Grant for Oil History

Standard Oil Co. (N.J.) has made an additional $15,000 grant supplementing an earlier $15,000 gift to the University of Oklahoma to aid in preparation of a book on the petroleum industry in the Southwest.

Research was begun a year ago by Dr. Carl C. Rister, research professor of history. The book is expected to be published early in 1949.

Texas Lease Sale Set

About 95 per cent of the area to be offered for leasing at the public school land mineral lease sale in Texas November 4, will be composed of bay and tidewater lands.

Thiele to Address A.I.Ch.E.

Dr. E. W. Thiele, assistant director of research for Standard Oil Co. (Ind.), will speak September 10 in Tulsa on "The Neglected Unit Operations," at a group meeting of the American Institute of Chemical Engineers in the Hotel Mayo. A new chairman will be elected at the meeting.

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Among the Drilling Contractors

Kilgore Students Rigging Up $20,000 Steam Rotary

Students in the drilling-procedures class at Kilgore College, Kilgore, Tex., are rigging up a $20,000 steam rotary and will drill a 2,000 to 3,000-ft. hole for instructional purposes. The 12-month course is being sponsored by the American Association of Oilwell Drilling Contractors.

The 25 young men enrolled in the course work 4 hours each day, Monday through Friday, assembling the rig. In addition, they are enrolled in regular classes in industrial engines, machine-shop practices, and welding. Spanish is offered as an elective for those desiring work in South America.

Threeway Drilling Co. Dissolved by Partners

Threeway Drilling Co., Wichita, is being dissolved by H. W. Lewis, H. W. Lewis, Jr., and I. W. Murfin. Lewis and his son have formed **Lewis Drilling Co.**, and Murfin will continue in the drilling business as **Murfin Drilling Co.** The former offices of Threeway Drilling Co. in the Union National Bank Building will serve both the new companies.

Helmerich & Payne, Inc., Tulsa, is drilling a 10,500-ft. test to the Massive sand for Sinclair-Wyoming Oil Co., the 1 De Marco, SE SE SW 14-6n-2w, on northwest flank of LaGranfe field, Adams County, Mississippi. Helmerich & Payne are also moving in rotary for a 9,500-ft. wildcat in South Chaves County, New Mexico. This deep test is the Richfield Oil Corp. 1 Blanche S. Trigg, 660 ft. from south and 1,980 ft. from east lines, 35-14s-27e, 13 miles south of Hagerman.

Guy Mabee Drilling Co., Tulsa, will drill to the Natatosh at its 2 S. L. Smith, 34-22n-1w, Union Parish, Louisiana.

Miller Brothers, Alice, Tex., have contract for Southern Minerals, Inc., deep wildcat in Runnels County, West Texas, on land of K. V. Northington 1 mile west of Ballinger. Derrick is up and operations are to start immediately.

Herley and Kelley drilled Shell Oil Co., Inc., 1 Union-Poindexter, discovery well of the Northwest Athens pool, California.

Regent Drilling Co., Ltd., Vermilion, Alta., has just purchased a new rig and put it to work in Leduc area of Alberta.

West Central Drilling Co., Dallas, is active in the newly opened extension to Reddin pool, Taylor-Jones County, Texas. West Central et al. have staked two locations, 7 S. M. Reddin, 330 ft. from south and east lines, Section 25,

Drilling class at Kilgore College, Kilgore, Tex., connecting steam and water lines on steam rig used for instructional purposes. This 12-month course is sponsored by the American Association of Oilwell Drilling Contractors and is approved by the Veterans' Administration for compensation under the G. I. Bill of Rights

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LONE STAR 2—2 swivels, ½, ⅝ or ¾" chain

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Block 17, T&P Survey, and 9 R. V. and C. M. Bell, 330 ft. from north and west lines, Lot 2, J. A. Nabors Survey 9. In addition, the company is completing a producer in the extension, its 1 Reddin Brothers, Section 24, Block 17, T&P survey, with casing set at 2,675 ft.

Puritan Drilling Co. has pits dug for its 1 A. Straus, NE NE NE 21-8s-9e, Gallatin County, Illinois.

B. H. Drilling Co., Dallas, is contractor for a 5,700-ft. test, Keith Railway Equipment Co. 1 Henderson, Frances Perez Survey, 8 miles southwest of Lovelady, Tex.

Sante Fe Drilling Co., Santa Fe Springs, has the contract for Union Oil Co. 62 Bell, Cat Canyon field, Santa Barbara County, California.

Big Chief Drilling Co., Oklahoma City, is spudding its 2 Davis, SE SE SW 22-13n-1e, Jones field area, Jones County, Texas.

Arrow Drilling Co., Tulsa, has the contract for W. L. Hernstadt and Gilmer Oil Co. 1 Cannon Barron, W. G. McKensie Survey, northeast side of Barron Pettit gas pool, Texas. This test is contracted for 8,500 ft. with Smackover lime as the objective.

Pacific Drilling Co. will drill President Oil Co. 1 Plavens, Huntington Beach Town Lot area, Orange County, California.

Harvey Drilling Co., Wichita Falls, is drilling a wildcat, its 1 Wilson, M. L. Webster Survey A-1118, east of Gainesville, Cooke County, Texas.

Don Ingling, Wichita, has received contract for Edouard Jonas 1 Schlochtermeyer, NE SE NE 28-18-11, ½ mile southwest of Ames pool, Barton County, Kansas.

H.E.R. Drilling Co., Oklahoma City, has started a 4,900-ft. test, its 1 Carl Johnson, NW NW SW 29-18n-3e, Payne County, Oklahoma.

Rine Drilling Co., Great Bend, is rigging up for a wildcat, Lion Oil Co. 1 Curry, NW NW NW 25-29-12, Pratt County, Kansas.

Camay Drilling Co., Los Angeles, has the contract for Southern California Petroleum Corp. 105 Adams-Aguirre, Ramona field, Ventura County, California.

Delta Drilling Co., Shreveport, is planning a 4,500-ft. test, its 1 W. H. Coker, Nacogdoches University Survey A-702, 4 miles southeast of Reilly Springs, Hopkins County, East Texas. Delta is also spudding a wildcat in Smith County, Texas, its 1 H. Y. Jackson, Hezekiah George Survey, an 8,000-ft. test.

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STATISTICS and

WEEKLY WELL COMPLETIONS . . . WEEK ENDED AUGUST 30, 1947

	Total of all wells					Cum.		Wildcat completions and discoveries					Cumulative total, 1947				
	Comp.	Oil	Gas	Dry	Footage	1947	1946	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	42	20	0	*22	55,111	1,046	1,048	0	0	0	0	0	3	0	0	2	5
Pennsylvania	62	33	5	†24	97,943	1,920	2,639	0	0	0	0	0	0	0	3	1	4
West Virginia	24	1	22	1	64,673	554	476	0	0	1	0	1	0	0	13	6	19
Ohio	29	9	12	‡8	78,048	864	796	0	0	0	0	0	0	0	3	32	35
Indiana	19	12	0	7	38,123	419	240	1	0	0	1	2	19	0	0	33	52
Kentucky	15	7	1	7	20,157	441	322	1	0	0	1	2	7	0	0	31	38
Illinois	40	21	0	19	99,206	1,329	1,468	0	0	0	1	1	47	0	1	231	279
Michigan	20	6	6	8	43,474	561	536	1	0	0	5	6	6	0	10	145	161
Kansas	55	32	6	17	175,033	1,697	1,315	0	0	0	7	7	27	0	11	226	264
Neb., Mo., Iowa	0	0	0	0	0	4	15	0	0	0	0	0	0	0	0	4	4
Oklahoma	96	41	23	32	342,378	2,713	1,754	3	0	2	18	23	65	4	11	453	533
Texas	214	130	12	72	890,071	5,956	5,305	2	7	1	36	46	192	43	61	894	1,190
North Central (Dist. 7-B & 9)	64	32	0	‡32	154,391	1,927	1,897	0	0	0	14	14	59	0	8	305	372
West (Dist. 7-C & 8)	60	54	0	6	265,661	1,436	1,136	1	0	0	4	5	21	0	3	108	132
Panhandle (Dist. 10)	15	6	6	3	61,136	287	217	0	0	0	2	2	1	0	1	7	9
Eastern (Dist. 5 & 6)	15	9	1	5	75,449	342	494	0	1	0	1	2	5	1	4	74	84
Gulf Coast (Dist. 3)	27	13	2	12	180,732	1,035	1,163	0	4	0	8	12	51	32	26	186	295
Southwest (Dist. 1, 2 & 4)	33	16	3	14	152,702	929	398	1	2	1	7	11	55	10	19	214	298
Louisiana	40	24	3	13	201,855	948	883	1	0	0	6	7	26	16	9	131	182
Northern	25	14	3	8	74,567	533	493	0	0	0	5	5	3	1	3	77	84
Southern	15	10	0	5	127,288	415	390	1	0	0	1	2	23	15	6	54	98
Arkansas	5	4	0	1	18,021	178	118	0	0	0	0	0	1	0	0	34	35
Mississippi	13	8	0	5	116,149	323	160	0	0	0	2	2	0	0	1	60	61
Southeastern States	0	0	0	0	0	38	29	0	0	0	0	0	0	0	0	33	33
Montana	5	1	2	2	9,024	176	202	0	0	0	1	1	3	0	5	16	24
Wyoming	9	3	0	6	23,964	151	118	1	0	0	3	4	9	0	2	24	35
Colorado-Utah	3	3	0	0	19,433	131	94	0	0	0	0	0	2	0	1	33	36
New Mexico	8	5	1	2	33,667	345	246	0	0	0	2	2	4	0	1	24	29
California	37	31	1	5	184,039	1,281	1,132	0	0	0	3	3	34	0	6	184	224
Total United States	736	391	94	251	2,510,369	21,075	18,896	10	7	4	86	107	445	63	138	2,597	3,243
Total previous week	669	374	52	243	2,223,646	20,339	18,292	15	6	5	82	108	435	56	134	2,511	3,136
Total August 31, 1946	604	331	63	210	2,005,044			20	0	1	88	109	353	28	83	2,230	2,694

Service wells included: *22, †23, ‡1.

CRUDE PRICES AND REFINERY ACTIVITY

GRAVITY SCHEDULES

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.*	Okla-homa, Kansas	Gulf Coast Tex.†	West Tex.‡
18-18.9	$1.60	....	....	....
19-19.9	1.65	....	....	....
20-20.9	1.69	$1.55	....	$1.42
21-21.9	1.73	1.57	....	1.44
22-22.9	1.77	1.59	....	1.46
23-23.9	1.80	1.61	....	1.48
24-24.9	1.84	1.63	$1.86	1.50
25-25.9	1.88	1.65	1.88	1.52
26-26.9	1.91	1.67	1.90	1.54
27-27.9	1.95	1.69	1.92	1.56
28-28.9	1.99	1.71	1.94	1.58
29-29.9	2.02	1.73	1.96	1.60
30-30.9	2.06	1.75	1.98	1.62
31-31.9	....	1.77	2.00	1.64
32-32.9	....	1.79	2.02	1.66
33-33.9	....	1.81	2.04	1.68
34-34.9	....	1.83	2.06	1.70
35-35.9	....	1.85	2.08	1.72
36-36.9	....	1.87	2.10	1.74
37-37.9	....	1.89	2.12	1.76
38-38.9	....	1.91	2.14	1.78
39-39.9	....	1.93	2.16	1.80
40 and above	....	1.95	2.18	1.82

*Standard Oil Co. of Calif. posting. †For crude from Daboval, El Campo, and Sandy Point. ‡Includes Lea County, New Mexico.

A.P.I. REFINERY REPORT, WEEK ENDED AUGUST 23

(Thousands of barrels)

District—	Crude runs, daily avg.	Production				Stocks at refineries, bulk terminals, in transit and in pipe lines			
		Gaso-line†	Kero-sine	Gas & dist. oil	Resid-ual	Gaso-line*	Kero-sine	Gas & dist. oil	Resid-ual
East Coast	804	2,103	207	1,190	1,528	19,784	8,390	15,733	10,466
Appalachian:									
District 1	108	329	43	85	100	2,144	362	597	314
District 2	69	253	34	58	123	907	202	132	185
Ind., Ill., Ky.	822	3,020	329	849	1,084	15,047	2,620	6,473	4,765
Okla., Kans., Mo.	430	1,568	131	515	508	6,869	1,052	2,912	1,343
Inland Texas	225	961	85	137	441	2,787	510	539	836
Texas Gulf Coast	1,273	4,135	721	1,610	1,743	13,266	3,177	9,139	6,499
La. Gulf Coast	415	1,038	383	546	513	4,367	1,998	2,312	1,849
N. La. & Ark.	70	169	47	58	126	1,202	485	502	188
Rocky Mountain:									
New Mexico	12	40	3	11	19	85	15	19	30
Other Rocky Mt.	144	436	14	155	254	2,034	158	864	728
California	845	2,487	94	678	2,235	15,423	1,012	13,896	27,775
August 23, 1947	5,217	16,539	2,091	5,892	8,674	83,915	19,981	53,118	54,978
August 16, 1947	5,202	16,056	2,093	6,061	8,831	84,983	18,808	51,685	54,000
August 24, 1946	4,953	15,055	1,854	5,405	7,938	86,039	18,473	52,230	52,036

*Finished and unfinished. †At refineries including natural blended.

Bureau of Mines crude-oil stocks 227,642,000 bbl. as of August 23—up 1,566,000 bbl. One year ago 225,672,000 bbl.

FLAT CRUDE PRICES

Representative posted schedules per bbl.	
East Texas	$1.95
Kettleman Hills, California*	2.14
Beauregard Parish	1.90
Illinois Basin	2.07
Pecos County, Texas (Yates)	1.65
Bradford, Pennsylvania	4.30
Eastern Ill. and Western Ind.†	2.07
Tomball, Texas Gulf Coast	2.10

*37°-37.9°. †35° and above.

TRENDS

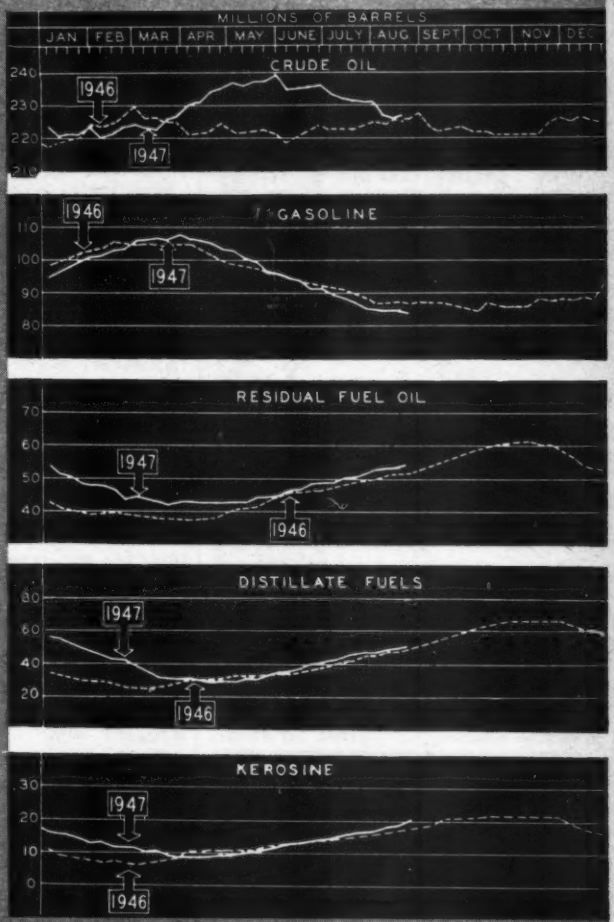
DAILY AVERAGE PRODUCTION FOR WEEK

	Aug. 30 crude oil	B. of M. Aug. demand	Aug. 23 crude oil
Alabama	1,050	1,200	1,050
Arkansas	81,650	81,000	81,300
California	927,900	920,000	926,000
Colorado	47,110	43,000	43,400
Eastern	64,100	65,400	64,500
Florida	1,100	800	950
Illinois	171,300	200,000	168,000
Indiana	17,000	18,000	17,050
Kansas	303,750	305,000	297,850
Kentucky	25,100	27,000	24,200
Louisiana	437,400	437,000	437,050
North Louisiana	107,350	.....	107,000
South Louisiana	330,050	.....	330,050
Michigan	41,795	45,000	42,015
Mississippi	100,055	96,000	99,905
Montana	23,780	24,000	24,060
Nebraska	550	600	550
New Mexico	107,950	106,000	107,950
Oklahoma	393,250	405,000	391,650
Texas	2,306,050	2,255,000	2,306,050
Dist. 1 (Southwest)	23,600	.....	23,600
Dist. 2 (Southwest)	161,175	.....	161,175
Dist. 4 (Southwest)	245,250	.....	245,250
Dist. 3 (Gulf Coast)	487,385	.....	487,385
Dist. 5 (Eastern)	39,480	.....	39,480
Dist. 6 (Eastern)	116,825	.....	116,825
East Texas Field	324,000	.....	324,000
Dist. 7-C (West)	39,560	.....	39,560
Dist. 8 (West)	618,230	.....	618,230
Dist. 7-B (W. Central)	39,400	.....	39,400
Dist. 9 (N. Central)	127,525	.....	127,525
Dist. 10 (Panhandle)	83,620	.....	83,620
Wyoming	121,600	122,000	120,430
Total United States	*5,172,490	5,152,000	5,153,960
Change from prev. wk., up	18,530		

Total production January 1-August 30.. †1,203,938,695 bbl.
Same period last year (crude plus cond.) 1,146,096,950 bbl.

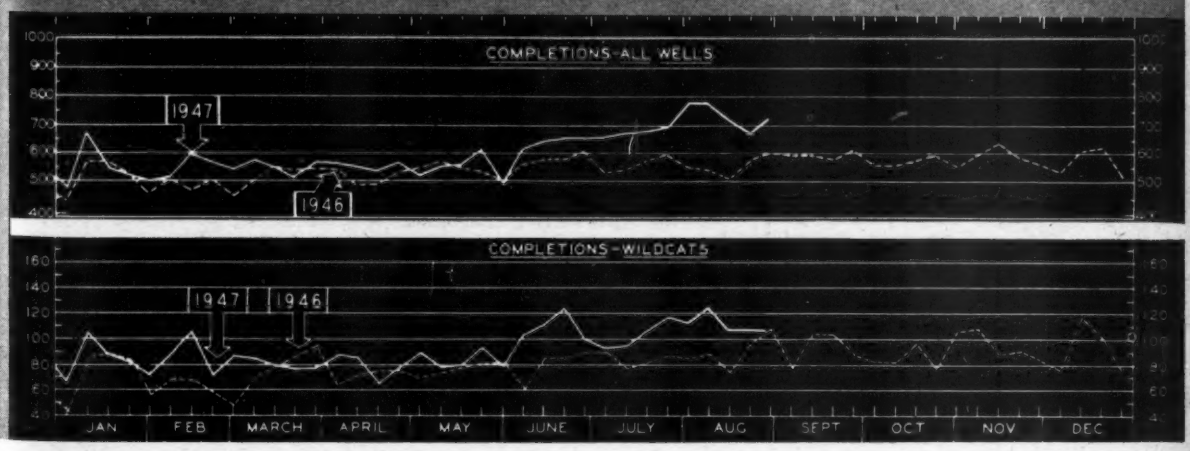
*Not incl. 41,165 bbl. condensate. †Incl. 7,447,540 bbl. condensate.

OIL STOCKS IN THE UNITED STATES



DAILY OPERATIONS

Solid line charts weekly completions, service wells in Eastern area included.



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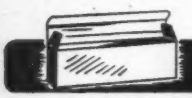

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MARKETS

STANDARD OIL CO. (Ind.), petroleum market leader in an 11-state midwestern territory, August 28 announced a ½-cent increase in tank-wagon prices affecting five grades of heating oils and diesel fuels.

The increase, effective September 1, will bring Indiana Standard's tank-wagon prices more in line with those affected by the extremely strong Mid-Continent tank-car market. One independent supplier commented the raise "should have been a cent" and declared other jobbers have been "squeezed badly" by rising tank-car prices.

In its announcement, Indiana Standard said the products affected by the increase have been "underpriced in relation to costs of production in a period when a sharp shift of yields from gasoline to kerosine and distillate fuels is essential to provide the required supplies of heating oils for the approaching winter season."

The announcement also said: "Even though it is small, the increase in price should be helpful in ecouraging maximum refinery yields . . . It should also facilitate shipments into the area from other refinery centers."

Spot Market Negligible

In the Mid-Continent area last week, trading on the open market was practically non-existent under the pressure of the greatest over-all demand for petroleum products in the history of the industry. Gasoline demand continued unabated, and suppliers at all levels sought heating oils for storage to meet winter requirements.

Buyers and sellers on the open market generally spoke of prices in terms of so much "above the market." Though all products were eagerly sought, demand appeared to be heaviest for motor fuel and the intermediate grades of heating oil. Offers for kerosine and range oil were reported to be only about ½ cent above what was being offered for No. 2.

One large buyer told of canvassing some 30 independent refiners in the Mid-Continent area in Texas, Oklahoma, and Kansas in an effort to buy motor fuel or heating oil. Though he did not mention price, all reported no material available.

One commentary on the current condition of petroleum markets was the urgent appeal made last week by Oklahoma state officials for 5,600 bbl. of fuel oil for one of the state orphanages. Later in the week, Fen-Ter Refining Co. at Wynnewood, Okla., promised to furnish the material.

Gulf Coast Market Conditions

The Gulf Coast market was described as still "out of sight." Here little spot-market motor fuel was moving, though offers ranged up to 10½ cents. Bids to buy No. 2 fuel oil were reported to be ranging up to close to 10 cents. One informed observer pointed out the volume of heating oils going to storage is very heavy. He added some of the prices being paid are predicted on the belief East Coast prices will rise much higher this winter.

Gulf Coast neutral lubricating oils were reported in better supply, though not enough to affect prices. Low price of No. 5 fuel oil on the Gulf Coast moved up from $2.35 to $2.60 last week. The high remained at $2.80.

Representative Quotations

Representative spot-market quotations of leading suppliers as of September 1, 1947. Figures are f.o.b. plant for tank-car shipment in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor	Texas Gulf Coast
Regular gasoline, 73-75 octane	8.5-9.5	10.3-10.5* 9.3-9.5†	9-10
Premium gasoline, 78-89 octane	9.25-10.25	10.2-12	9.5-10.5
42-44 w.w. kerosine	7.5-7.75	7.8-8.1	7.5-8
No. 2 straw fuel oil	7.25-7.75	6.8-7.2	7.7.5
No. 6 residual	$2.15-2.50	$2.22-2.52	$2.00-2.75

*Branded (74-76 octane); †Unbranded (74-76 octane).

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	6.125	5.625	5.875
Grade 18-55	7.35	6.75	7.05

LUBRICATING OILS
South Texas

200 vis., No. 2-3 neutral	11.5-12.5
750 vis., No. 3-4 neutral	13.5-15.25
2,000. No. 5-6 neutral	15-16.75

LUBRICATING OILS
Mid-Continent

150-160 vis. D bright stock, 0-10 p.p.	39
200 vis. No. 3 neutral, 0-10 p.p.	18-19

Western Pennsylvania

145-155 vis. 10 p.t. bright stock	45
180 vis. 0 p.t. neutral	43

CRUDE-SCALE WAX
Mid-Continent

130-132 A.S.T.M. melting point	6.75-7.75

Peru—Oil Report

(Continued from page 48)

should be discussed separately. First a broad picture of the organization is in order.

Administrative headquarters in Peru are maintained at Lima, where the marketing division also is situated. Operating headquarters of the refinery are found at the large marine terminal at Talara, Peru's second largest port. The harbor facilities amply handle large vessels in the harbor where there are two moles, and there also is a submarine tanker-loading line leading offshore.

To the west, in a semicircle around the refining center at Talara, extends the various oil pools found on International's 643-sq. mile LaBrea-Parinas Estate. It is interesting to note that the discovery well, "B" 1-N-2, was completed in 1875. The company owns the estate property in fee and has operated it more than 30 years. Drilling and producing headquarters are at Negritos, a few miles south of Talara.

Both at Talara and at Negritos, International has built and maintains modern housing, recreational facilities, telephone systems, utilities, schools, transportation, churches, hospitals, business buildings, and many other functional utilities for the total population of approximately 35,000. This figure includes the wives and children of the employes. The total working staff of International is about 5,700.

Several million dollars are being spent by International in constructing many new and attractive housing units, under a 5-year plan which will result in Talara becoming extensively modernized. It already is a model industrial city of the first order. Talara and Negritos, besides being served by water transportation, have a modern airfield which is a stopping point for Panagra Airways. The cities also communicate directly with the Pan American coastal highway.

Producing.—Last year, production from the LaBrea-Parinas Estate totaled 10,022,533 bbl. of crude oil (27,459 bbl. per day). Total natural-gasoline production was 919,810 bbl. (2,520 bbl. per day).

Within the property to date approximately 3,050 producing wells have been completed. Currently, nearly 2,100 wells are on active production, and another 300 are used for gas input, closed in because of high gas-oil ratios, due for workovers, etc. As a whole, the average well depth is about 1,715 ft. The range of depths for the six different producing formations extends from about 800 to 5,000 ft. Deep exploratory work has been done, well No. 3,500 reaching a total depth 11,540 ft. in the Cretaceous.

The large majority of the pumping wells are operated by central powers, with about 175 wells flowing naturally and a smaller number operated on gas lift. Much of the coastal terrain is relatively flat and lends itself ideally to central power operation. Central power plants number 140.

Drilling.—Exploration and development drilling both are being actively continued by International. Last year 94 wells were completed. Of these, 29 were exploration wells and 65 were development wells drilled in existing fields. Of the exploratory wells, four opened up new oil pools and three discovered small gas pools. Deepening to lower formations also is active in the territory. Last year 32 old wells were drilled deeper to lower producing formations. In 1946 the total footage drilled by International was 325,468 ft. The company operates 19 rotary drilling rigs, of which 7 are heavy-duty units capable of drilling to 10,000 ft. and better. Cable-tool equipment also has been operated for many years.

Natural gasoline. — International's natural-gasoline department operates plants in Mile Six, Parinas, Lagunitos, Lomitos, Ancha, and High Verdun pools. The plants have a total normal manufacturing capacity of 125,000 gal. per day and can handle over 50,000,000 cu. ft. of casing-head gas per day. In addition to natural gasoline, liquefied petroleum gas is manufactured and bottled.

Refining. — While consumers in Peru are quite familiar with International's Rapidol and Essolene products, the refinery at Talara manufactures a long list of commodities which includes aviation and motor gasolines, kerosines, various fuel oils, many motor and special-type industrial oils, as well as a variety of greases.

Basic units in the refinery consist of five large shell stills operating in cracking coils with two soaking drums, an asphalt plant, a vacuum plant, lubricating-oil plant, continuous and batch treaters, agitators, complete grease plant, can and drum-manufacturing plants, and many other allied facilities. For charging stocks, both high and low-test crudes are available.

Ganso Azul Operations in Montana

Cia. de Petroleo Ganso Azul, Ltd., operates the 74,000-acre Agua Caliente concession in the Montana region. By the end of 1941, seven wells had been drilled, six being classed at that time as oil producers.

Production comes from Lower Cretaceous formations at a depth range from 1,200 to 1,500 ft. The production is situated on the Agua Caliente anticline which is about 15 miles long and 9 miles wide. The trend is northwest-southeast. Dips range as high as 25° to 30° to the northwest and are somewhat less on the southwest flank. Closure has been estimated at 3,500 ft. Locally the dome is known as LaCumbre.

Well No. 7 was completed in the latter part of 1946 and originally was reported to have had an initial production of 3,700 bbl. per day although presently it is flowing at a lesser rate. Currently three wells are listed as being on production, with No. 8 drilling. Rotary tools are used. Heavy equipment for drilling and developing the field came in by way of the Amazon River across Brazil. Personnel and small equipment have been flown in by plane from Lima.

Three miles from the producing wells on the Rio Pachitea, a far-upstream tributary to the Amazon River, is the company's refinery. This is a straightrun distillation operation manufacturing gasoline, kerosine, diesel oil, and residual fuel oils. The equipment consists of five shell stills having a capacity of 500 bbl. per day. A group of tugs and barges market the products down the river to Iquitos where storage tanks and a canning plant are operated.

The Ganzo Azul property is notable as being the first commercial production developed in the montana region. The area lies in the great geosyncline extending from Trinidad through Venezuela, Colombia, Ecuador, Peru, Bolivia, and Argentina into Paraguay, a vast area potentially rich in oil deposits. Many seepages have been reported and rocks, known to be petroliferous elsewhere, are present.

Other Companies

In the Peruvian montana country, Socony-Vacuum Oil Co., Inc., and Compania Petroleo Shell de Peru are carrying on reconnaissance exploratory work as well as International Petroleum Co. Also Compania Peruana de Petroleo-El Oriente, at Puerto Oriente on the Ucayali River, is projecting drilling operations.

PERUVIAN OIL FIELDS AND PRODUCTION DATA

Name of field—	Year of discovery	No. of prod. wells: Flowing	No. of prod. wells: Pumping	Producing depths	Daily avg. production (bbl.)	Accumulative production (bbl.)	Name and type of formation	Gravity, A.P.I.
La Brea-Parinas	1888	172	1,874	1,500-5,000	28,000	278,000,000	Tertiary sands	34.4°-37.6°
Lobitos district	1904	80	709	3,000-6,300	6,200	63,000,000	Eocene sands	26°-45°
Zorritos	1883	...	50	300-1,700	300	3,800,000	Miocene sands	38°
Agua Caliente	1939	3	....	1,000-1,100	500	300,000	Cretaceous sands	44.5°
		255			35,000	345,100,000		

EQUIPMENT MEN ... in the News

Pittsburgh Equitable Meter Name Advertising Manager

William F. Weimer, for the past several years assistant advertising manager of Rockwell Manufacturing Co., Pittsburgh, has been named advertising manager of the company's Pittsburgh Equitable Meter Division. In his new responsibility, he will have charge of the complete advertising program for Pittsburgh Equitable Meter Division's lines of water, gasoline, oil, and gas meters; gas regulators, and other products. He will also continue to assist with the administration of the over-all advertising program of Rockwell Manufacturing Co. and its 14 operating divisions and subsidiaries.

Fogg Appointed to High Position Under Lilienthal

Phillip S. Fogg, head of Consolidated Engineering Corp., has been appointed by David E. Lilienthal, chairman of the U. S. Atomic Energy Commission, to an important task in the reconversion of the atom from war to peace. Fogg will act as special advisor to the acting manager of the Chicago Directed Operation, Atomic Energy Commission. The Chicago operation, which involved the assimilation of ideas and experiments which flow towards this center from other atomic energy divisions, at this time is commencing the construction of a new laboratory, to be known as the Argonne National Laboratory, which will cost in exxcess of $40,000,000.

Treffeisen New Alemite Sales Manager

Gustave Treffeisen has been appointed sales manager of the Alemite distribution division of Stewart-Warner Corp., succeeding Charles I. Kraus, who has become Alemite distributor at Minneapolis.

Jubien Now With Barium

Walter E. Jubien, recently of the French Supply Council, Washington, D. C., has become associated with Barium Steel Corp. He will assist in the further development of the export sales of products of subsidiaries of Barium. For the past 3 years Jubien has been a member of Mission of Industrial Production of the French Supply Council where he was in charge of commercial relations with American suppliers.

Hoyt Manager of Woven Wire Fabrics

F. G. HOYT

To coordinate the recently announced program of modernization and expansion of production facilities in Woven Wire Fabrics Division, John A. Roebling's Sons Co., announces the appointment of F. G. Hoyt as general manager. Hoyt, who is widely experienced in the aggregate wire screen and allied fields, will be ably assisted in his new capacity by J. Fennell Berger, assistant manager of sales, and F. Clifford Peet, superintendent of production.

Rubin Joins Laboratory Staff

Melvin S. Rubin, a June graduate of Case Institute of Technology and engineer formerly connected with the Government's atom-bomb plants, has joined the staff of American Gas Association Testing Laboratories. He is at present assigned to the testing department in Cleveland.

Garretson Retiring as Advertising Chief of Leeds & Northrup

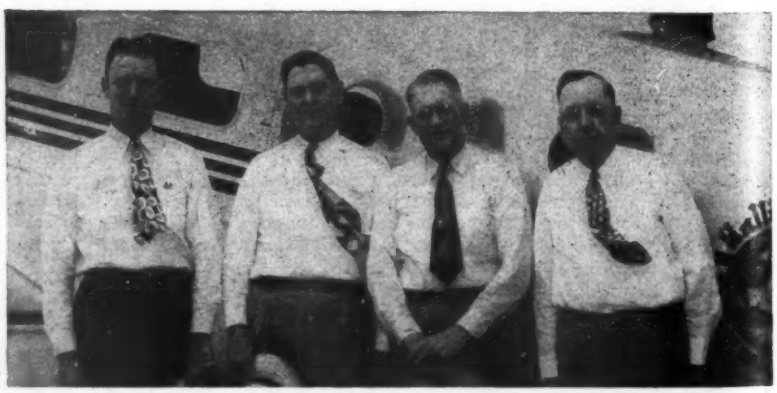
L. R. Garretson, since 1925 advertising manager of Leeds & Northrup Co., announces his retirement which is made necessary by the condition of his health. Garretson is a past president of Eastern Industrial Advertisers, Philadelphia chapter of N.I.A.A., and a former director and vice president of the national association. He also belongs to American Marketing Association and American Management Association. His successor is Kenneth W. Conners, who has been a member of the advertising division since 1934.

Rettaliata Addresses Electrical Engineers

Dr. J. T. Rettaliata, director of the department of mechanical engineering of Illinois Institute of Technology and engineering consultant for Allis-Chalmers Manufacturing Co., addressed the American Institute of Electrical Engineers in Mexico City recently on the subject of "Gas Turbines and Jet Propulsion."

Armistead To New Office

George Armistead, Jr., consulting chemical engineer for the petroleum, chemical, and related industries announces the removal of his offices from 1519 Connecticut Avenue to larger quarters in Suite 712, 1200 Eighteenth Street, Washington.



Three new department managers to assist in directing the company's expanding field operations were recently announced by Halliburton Oil Well Cementing Co. New chiefs, shown here, are: L. B. Meaders, in charge of drill-stem testing; H. P. Conroy, manager of cementing operations; and Fred R. Whitten, in charge of plastics, acidizing, and dump-bailer services. W. B. McClendon, vice president and executive manager of field operations, is shown at right.

Orbit Valve Increases Sales Personnel

Jack H. Hancock, with headquarters in Oklahoma City, will represent Orbit Valve Co. in Oklahoma and Kansas, taking over the territory formerly served by T. G. "Ted" Harrington, who will now represent Orbit in southwest Texas. Harrington's headquarters will now be in Corpus Christi. Before joining the company's sales force Hancock was with Larkin Packer Co. as representative in Kansas, Texas, and the Oklahoma Panhandle. Henry C. "Buz" Sawyer has been transferred to the home office at Tulsa. His territory of North and Central Texas and the Texas Panhandle will be served by Gerold G. "Jerry" Lowe, with headquarters at Wichita Falls, Tex. Before joining Orbit, Lowe had been associated with United Supply & Manufacturing Co., and Unit Rig & Equipment Co., except for 3 years spent with the Seabees. Other territories not affected by personnel changes are South Texas served by R. G. "Bob" Cole located at Houston; West Texas covered by Dell Taylor who headquarters at Midland, and L. E. "Ed" Wallace, located at Newark, Ohio.

Allinson Heads Houston Office

J. B. Allinson has been placed in charge of the Houston office of Refinery Maintenance Co., Compton, Calif. Allinson is well known in refining circles, having been vice president of J. J. Allinson & Son, Inc., Houston. He was connected earlier with Hydrocarbon Research, Inc., of New York, with Ford, Bacon & Davis at Oak Ridge, Tenn., and with Lion Chemical Corp., at El Dorado, Ark. The new office is at 2801 San Jacinto Avenue, Houston.

Link-Belt Names Musschoot

Albert Musschoot, a member of the general engineering staff of Link-Belt Co. at Philadelphia, has been appointed assistant to the chief engineer, with headquarters at the company's general office, 307 North Michigan Avenue, Chicago. In this capacity, he will be directly responsible to Richard F. Bergmann, vice president and chief engineer.

Tuboscope Opens Pittsburgh Branch

Tuboscope Co., oil-field tubular inspectors, has announced the opening of a branch inspection yard in the Pittsburgh area to provide inspection services for buyers of tubular goods produced there. In commenting upon their expansion to the East, J. W. Bozeman, assistant general manager of the company, pointed out that more and more operators are demanding inspection of new pipe before it is placed in service, and that the Pittsburgh yard has been established to enable oil operators to ship inspected pipe direct from the Pittsburgh area to field locations.

Tesco Now Making Stainless Steel Castings

With the recent addition of a special new, flexible-type furnace at Texas Electric Steel Casting Co., Houston, high-alloy steel castings for heat and corrosion-resistant applications have been made available on a commercial scale for Gulf Coast refineries and manufacturers. Concentration of the petrochemical industries in the Gulf Coast has resulted in an increasing demand for stainless-steel castings in the region.

Baroid Changes Houston Office

The office location of Baroid Sales Division of National Lead Co. has been changed to the seventh floor of the new City National Bank Building in Houston. The testing-equipment department and well-logging shop will retain their present shipping and mailing address—35 Artesian Place, Houston. Fred A. Christanelli, formerly assistant Gulf Coast sales manager of Baroid, has been appointed director of public relations with offices in City National Bank Building.

De Long and Gibson Elevated in Twin Disc

Roger G. DeLong has been appointed manager and W. B. Gibson sales manager of the hydraulic division of Twin Disc Clutch Co. The hydraulic division is in Rockford, Ill., while the headquarters and main factory is in Racine, Wis. DeLong has been serving as both acting manager and sales manager of the Rockford division. Gibson has been assistant district manager of the eastern territory.

R. G. DELONG

W. B. GIBSON

Haddox Transfers Headquarters

Ralph Haddox, assistant manager of the tubular department of Oil Well Supply Co., has transferred his headquarters from Charleston, W. Va., to 1607 Frick Building, Pittsburgh. Haddox, former president and general manager of United Pipe & Supply Co., Charleston, was appointed to his present position in March.

Kuehmsted Moves To New York

A. M. Kuehmsted, chief engineer for Santa Fe Tank & Tower Co. in Los Angeles for the past 12 years, has been assigned to the New York branch. He will take over the district management of cooling towers, air-cooled units, and wood tanks at the New York office. Kuehmsted will make his headquarters at 400 Madison Avenue.

(Continued on page 155)

Representatives at the sales meeting of Buda Engine & Equipment Co. held in Dallas recently, were: C. C. Kirk, Dallas; J. T. Bumgardner, Houston; J. W. Lowes, Jr., Houston; Kirk Rote, Houston; R. W. Leissner, Houston; M. W. Hiltpold., San Antonio; A. H. Benson, New Orleans; J. M. Bridges, New York; D. E. Roberts, Dallas; J. T. McFarland, Dallas; J. L. Joplin, Houston; J. C. Baseheart, Dallas; T. T. Horner, Houston; W. S. Jacobsen, Odessa; J. W. Hughes, Dallas; M. F. Sherrard, Dallas; R. S. McCauley, Kilgore; A. B. Froese, Houston; J. D. Warrick, Kilgore; J. T. Crawford, Jr., Madisonville; C. W. Clement, Dallas; D. L. Elliott, Wichita Falls; A. E. Rightsell, Pampa; N. T. Howell, Wichita Falls; E. E. Keith, W. L. Somner, Tinsley; E. H. Groth, Dallas

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The Market Place for the Oil Industry

UNDISPLAYED

All ads except Situations Wanted, 10 cents a word. Minimum charge, $2.00 per insertion.
Situations Wanted ads, 5 cents a word. Minimum charge, $1.00 per insertion.
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FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

CULVERTS For Sale: 18" corrugated galvanized, sectional culverts. Will make any desired length and sustain heavy loads. Phone 3-9169, Tulsa, Oklahoma.

FOR SALE: 150,000 board feet of used road lumber located in Thornwell Pool Section 25-11-5w, Jefferson Davis Parish, Louisiana. Please contact O. C. Brown, Cities Service Oil Company, Gladewater, Texas.

FOR SALE

200—Horsepower Diesel Engines

Eight new Hercules Diesel engines: three Model DFXE; five Model DFXD. All equipped with Hercules Model ZXB gas starting engine and SAE No. 1 Bell Housing. Also one rebuilt Model BFXD. Very reasonably priced.

Purchasing Department

LaPLANT-CHOATE MANUFACTURING CO., INC.
Cedar Rapids, Iowa

PARTS FOR ARMY TRUCKS

New and Used

Largest stock in America, 6x6, 6x4, 4x4, 4x2. All items guaranteed. Largest auto wrecking house in the west with most complete stock of new and reconditioned parts for all cars and trucks. Fast service.

PIONEER AUTO WRECKING CO.
752 W. 13th Ave. Denver 17, Colo.

EQUIPMENT FOR SALE

FOR SALE: 10,000 sq. ft. steel airplane landing mat, 15" x 10' Sections. Will make into portable all-weather lease road for hauling equipment, etc. 10c per sq. ft., F.O.B. Tulsa, Oklahoma. Subject to prior sale or withdrawal. Also have several light plants at bargain rates. Marshall Travis, 110 Midco Bldg., Tulsa, Oklahoma. Phone 5-2251.

FOR SALE: Model K Cardwell, perfect condition w/5" & 7" tools complete. Morris & Son, Box 107, Carmi, Illinois.

FOR SALE: New Brewster Draw Works, 60-B Skid Mounted complete with Mast, Table and 6-SREU Waukesha $10,000.00. Box B-872, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: 25,000 feet of 7/8" National Grade 81 Sucker Rods. These rods are from light Bromide wells and are in excellent condition. A. D. English, Box 612, Ada, Oklahoma. Phone 2805.

STORAGE TANKS FOR SALE

Three 80,000 bbl. riveted storage tanks with steel roofs and structures, in excellent condition, now being dismantled. Diameter 117'-2"; height 41'-10"

Also have new 10,000 bbl. cone deck bolted steel tanks.

Phone: TRinity 2091

R. H. TECHLENBORG CO.
811 West 7th St.
Los Angeles 14, California
Cable address: RAYTECK

FOR SALE

1—Ditching Machine, Model 46, Buckeye, 6' Cutting Depth, 42" Wide, Gasoline Driven, Serial #3690.
1—Ditching Machine, Model 48, Buckeye, 8' Cutting Depth, 42" wide, Gasoline Driven, Serial #3776.
1—Backhoe, Buckeye Model 70, 35' Crane Boom, Fairlead Dragline, 3/4 yd. Bucket 3/4 yd. Trench Hoe, Motor #14414, Serial #C-36-520.
1—Tractor, RD-8 Caterpillar, Model B5-620, Serial #1H1508 with Berg Sideboom, Serial #475.

Above Equipment Available for Inspection

MORRISON BROS. CONSTRUCTION COMPANY, Inc.
P. O. Box 1000 Phone 414
Glasgow, Kentucky

EQUIPMENT FOR SALE

FOR SALE: Shaffer power draw works, powered by two J. L. 1335 Buda engines compounded. Suitable for 5,000 foot work. In A-1 condition. Price $7,500. Terms. Melton Well Service, Box 1360, Seminole, Oklahoma.

WELL DRILLING Machines, Spudders, Standard Outfits. Complete stock cable tools Used equipment reconditioned. Some Government surplus. Pressey & Son, Pueblo, Colorado.

NEW PUMPS FOR SALE

New Gaso Fig. #1860—4½" x 6" with engines—3"—2 Stage Byron Jackson with and less engines—Hale Chrysler Fire Pumps with engines—Aurora Model AD2 with engines—Lombard Fig. #1684 with engines—Novo Model KH2 with engines.

Write for Specifications and Prices

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SHOT HOLE DRILLS

Large and Small

All are truck mounted, rotary, chain pull down, smallest pump size 4 x 6. Some are in excellent condition; others need repair. Price F.O.B. Dallas, from $3,000 to $8,000, including truck.

For details write

8900 LEMMON AVENUE, DALLAS, TEX.

HYDRAULIC PUMPS

Aldrich Pump Co. Vertical Triplex HYDRAULIC PUMPS, 2¾" x 8", equipped with Herringbone gears, 67.5 GPM. Maximum pressure for intermittent duty 2,200 lbs., for continuous duty 1,800 lbs. Pump and motor mounted on common bed plate.

Motors are 75 HP, 3/60/220-440 volts, 1740 RPM. Complete with starting panel, consisting of G.E. motor starter switch, push button control, square "D" Switch, and capacitator.

Purchased new 3½ years ago. Excellent condition. Available for immediate delivery.

CONSOLIDATED PRODUCTS CO., INC.
17-20 Park Row, New York, N. Y.

DISMANTLED READY FOR IMMEDIATE DELIVERY

2500 barrel oil refinery, skimming, with 50,000 barrels steel storage.

Pumps—Pipe—Towers—Boilers—Lead Plant—Bulk Tanks—

2 Transport Trailors

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Stephens, Ark.

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